RUSS OLSON VOLUME 12A & B

EQUIPMENT

Description

Specifications, and Exterior and Interior Details

Sub-divisions Within This Volume

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CONTENTS OF
FRONT POCKET

Various Paint Color Samples From
Benjamin Moore and Hirschfields

SPECIFICATIONS

PRIVATE CAR
12-31-1915

GENERAL DIMENSIONS	
Length over Bumpers	43' 0"
Length over Body	33' 4"
Width over all	8' 9"
Height, floor to ceiling	7' 8½"
Height, rail to trolley board	11' 5"
Truck Centers	22' 6"
FRAMING	
Side Sills	1 pc. 5" x 5" Oak, reinforced with 1 3/8" x 4½" steel plate
End Sills	1 pc. 4" x 5" Oak, reinforced with 2 7/8" x 5" steel plate
Center Posts and End Posts	Ash
VESTIBULES	
Length	Front 3' 9"; Rear 3' 11"
Bumper	5" x 7" Oak and 5/16 "x 7" steel plate
Hand Rail	1 1" x 3' 3" brass, 4 brass sockets
SHEATHING	
Sides and Ends	9/16" x 2¼" Whitewood
ROOF	
Type	Monitor
Material	Canvas over Whitewood
WINDOWS	
Glass	1/8" Plate
Body - Side Sash	20 Drop 25¼" x 33"; 20 Drop 17" x 33"
End Sash	3 Drop 25¼" x 33"; 3 Drop 17" x 33", 4 panel
Front Vestibule - Side Sash	1 Drop 25" x 23¼"; 1 Drop 17" x 23¼"
End Sash	4 Drop 25" x 19½"; 4 Drop 17" x 19½"; 1 Drop 25" x 28 3/4"; 1 Drop 17" x 28 3/4"
Rear Vestibule - Side Sash	2 Fixed 2' 5½" x 5' 4¼"
End Sash	2 Fixed 2' 5½" x 5' 4¼"
Monitor Sash - Side	20 7½" x 32¼" Florentine glass
End	2 7½" x 34½", 1 Red, 1 Clear
DOORS	
Rear	1 3' 0" x 6' 1" sliding, single
Front Vestibule	1 22" x 5' 8" hinged, single
Rear Vestibule	1 29¼" x 5' 6½" hinged, single, plate glass 21½" x 55 3/8"
FLOOR	Oak
INTERIOR WORK	Mahogany ceiling panels, hand decorated
SEATS	
Number and Type	32 Chairs
Material	10 Wicker and cushions; 22 Oxidized
Davenport	1 2' 8" x 3' 0" x 6' 10", upholstered
Seating capacity	36
CURTAINS	
On Rollers	20 35" x 38"
Drapery on 23 5/16" brass rods	46 2' 0" x 3' 8"
STEPS	3 Rubber covered wood, brass trimmed
SIGNALS	
Gongs	1 12" diameter
Conductor Bells	2 4 1/8" diameter
Electric Push buttons	9
LIGHTS	29 110 and 120 watt Mazda
SPECIAL EQUIPMENT	Floor covering: Brussels carpet

Private Car Furnishings

A. L. Drum & Company Valuation Report
1-1-1916

Floor coverings: Brussels carpet, one Brussels 24" x 34" rug, one manila 1½" x 28" x 45" foot mat, one corrugated rubber 1/8" x 31" x 38½" mat, and one wire 14" x 16" mat.

Seats: 10 wicker chairs with cushions, 22 oxidized steel-frame chairs, and one upholstered davenport. Seating capacity 36 persons. Four foot stools. Two 8" x 16" x 16" cushions.

Curtains and draperies: 20 35" x 38" curtains on rollers, and 46 draperies on 23 5/16" brass rods.

Lights: 29 110 and 120 watt Mazda lamps.

Other furnishings: one mahogany table consisting of two 24" x 42" hinged leaves each supported by two 24" x 42" hinged legs, four 24" x 32" mahogany folding tables, one Seth Thomas 10" diameter brass and nickel clock, one Taylor Bros. nickel-trimmed thermometer, and six nickel-plated cuspidors.

Kitchen appliances: one General Electric electric stove, one General Electric oven, and one General Electric boiler.

Kitchen utensils: one 1-gallon Griswold aluminum coffee pot, one 1-gallon Wagner Sydney aluminum tea kettle, one 2-quart aluminum double boiler, one 3-gallon dish pan, two 1-quart Mason jars, one 1½" x 9" x 16" mahogany bread board, twelve ½-gill liquor glasses, ten ½-pint water glasses, two cork screws, four Turkish towels, and Bromo-Seltzer.

Miscellaneous: one fire extinguisher, one broom, one deck of Bicycle 808 playing cards, and four 5/8" transparent dice.

Note: an early floor plan showed a toilet compartment with fixtures adjacent to the left ("pole side") rear bulkhead. No listing of toilet fixtures can be found in any of the valuation reports.

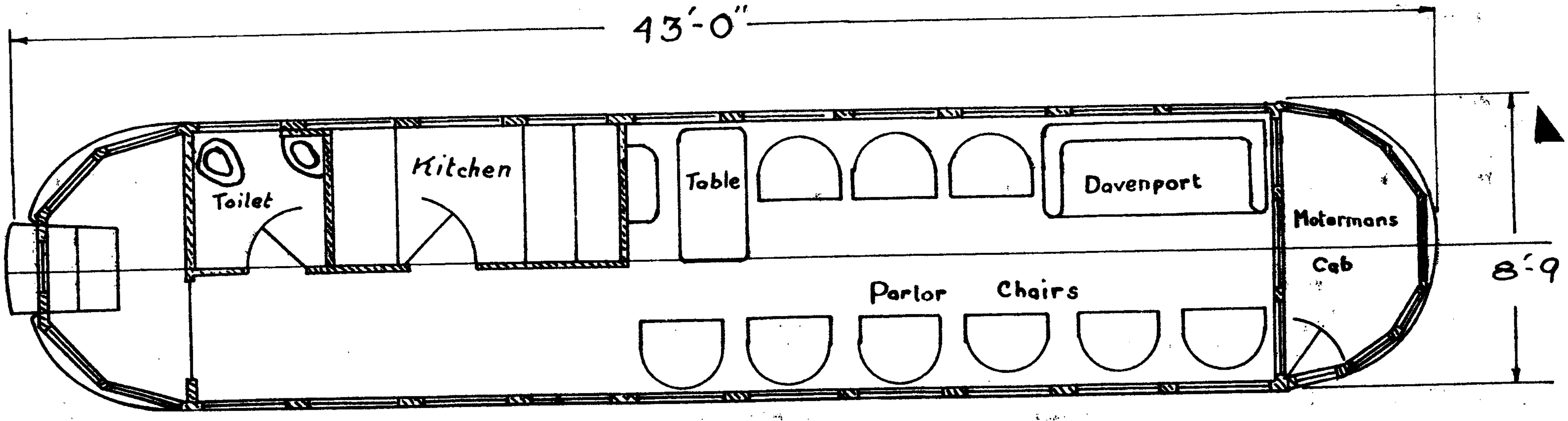

43'-0"
Toilet
Kitchen
Table
Davenport
Motormans
Cab
Parlor Chairs
8'-9'

Diagram of Car Dimensions
Tracing dated 5-23-1901

[Listed in the sequence the diagrams appeared on the tracing]

	Length	Width	Truck Centers
TCRT 1899 Pattern	43′ 2 ½″	8′ 9″	22′ 5 ½″
TCRT 1900 Pattern	43′ 2 ½″	8′ 9″	22′ 0″
TCRT 1901 Pattern	37′ 5″	8′ 5″	16′ 7 3/8″
American Vestibuled Old	42′ 6″	8′ 9″	21′ 6″
American Vestibuled Rebuilt 1901	42′ 6″	8′ 9″	22′ 5 ½″
American Open	41′ 7″	8′ 3″	23′ 0 ½″
Northern Open	37′ 0″	7′ 10 ½″	19′ 11 ½″

ST PAUL GLOBE 12-20-1903 #738

These cars are designed for both summer and winter service; the window sills are but twenty-seven inches from the floor, and the two sashes may be slipped down into the side of the car, making practically an open car. The length, as shown in the floor plan, is forty-one feet seven inches, and at the front end a buffing timber (bent to conform to the car end), nine inches thick at the center line of the car. This make the total length forty-two feet four inches. The weight of the body is ten tons; with trucks and motor, seventeen tons. The long sills are of Oregon fir, 4¾ by 6¾ inches; steel plates, ¾ by 5 inches, are let into the side sills; the short sills are of oak. The ends of the car are rounded, and both are vestibuled. There is but one entrance, and that is protected by safety gates. There are two steps, each 11½ inches high, to reach the platform; the steps are of the anwood type, made by the Q. & C. company.

CAR NO. 737
12-31-1915

GENERAL DIMENSIONS	
Length over Bumpers	43' 2 5/8"
Length over Body	33' 2 1/8"
Width over all	8' 8 3/4"
Height, floor to ceiling	7' 9¼"
Height, rail to trolley board	11' 6"
Truck Centers	21' 9"
FRAMING	
Side Sills	5" x 5½" Oak reinforced with 3/8" x 5" plate entire length
End Sills	5" x 6" Oak and steel, 7/8" x 5" steel plate
Center Posts and End Posts	Ash
VESTIBULE AND PLATFORM	
Length	Front 3' 9"; Rear 3' 8"
Bumper	7" x 9" Oak and steel, ¼" steel plate
Hand Rail	3/4" x 4' 10" brass tube, 3 cast iron sockets
SHEATHING	
Sides and Ends	9/16" x 2¼" Whitewood
ROOF	
Type and Material	Monitor; Canvas over Whitewood
WINDOWS	
Body - Side Sash	26 Drop 28¼" x 25 3/4"; 26 Fixed 28¼" x 17"
End Sash	3 Drop 30" x 25 3/4"; 3 Fixed 30" x 17"
	1 Drop 18" x 25 3/4"; 1 Drop 18" x 17"
	2 Fixed 16½" x 40"; 1 hinged and 1 removable 16½" x 40"
Storm Sash	26 29½" x 41½"
Front Vestibule - Side Sash	1 Fixed 23½" x 25 3/4"; 1 Fixed 23½" x 17"
End Sash	4 Drop 19½" x 25 3/4"; 4 Drop 19½" x 17"
	1 Drop 28¼" x 25 3/4"; 1 Drop 28¼" x 17"""
Rear Vestibule - Side Sash	1 Drop 23½" x 25 3/4"; 1 Fixed 23½" x 17"
End Sash	2 Drop 19" x 25 3/4"; 2 Drop 19" x 17"
	1 Drop 28½" x 25 3/4"; 1 Drop 28½" x 17"
Window Guards	3/8" Brass tube: 8 17"; 8 19"; 4 22". 2 28" C. B. sockets
Monitor Sash - Side	22 7 3/4" x 27½" Florentine glass
End	Rear 1 7" x 35" Red; Front 1 7½" x 53" Clear
DOORS	
Rear	1 3' 1" x 6' 2¼" single sliding
Front	None
Vestibule	1 22" x 5' 7" single hinged
GATES	2 pair, opening 32" each
FLOOR	Oak
INTERIOR WOODWORK	Birch
SEATS	
Number, Type and Material	14 Cross 16" x 2' 11½"; 2 Side 17" x 14' 8"; Rattan
Seating capacity	48
Width of aisle	Front 20¼"; Rear 4' 6"
CURTAINS	Woolen Terry
STEPS	2 Steel hanger, corrugated steel tread
SIGNALS	
Gongs	1 12" diameter
Conductor Bells	2 4 1/8" diameter
Electric Push buttons	26
LIGHTS	18 36 watt Mazda

CAR NO. 878

12-31-1915

GENERAL DIMENSIONS	
Length over Bumpers	37' 7"
Length over Body	27' 9½"
Width over all	8' 4 3/4"
Height, floor to ceiling	7' 8¼"
Height, rail to trolley board	11' 6"
Truck Centers	16' 7½"
FRAMING	
Side Sills	5" x 5½" Oak reinforced with 3/8" x 5" plate entire length
End Sills - Rear	5" x 12" Oak and steel, 5/8" x 5" steel plate
Front	5" x 6" Oak and steel, 5/8" x 5" steel plate
Center Posts and End Posts	Ash
VESTIBULE AND PLATFORM	
Length	Front 3' 7½"; Rear 3' 7"
Bumper	7" x 9" Oak and steel
Hand Rail	3/4" x 5' 2" brass tube, 3 cast brass sockets
SHEATHING Sides and Ends	9/16" x 2¼" Whitewood
ROOF	
Type and Material	Monitor; Canvas over Whitewood
WINDOWS	
Body - Side Sash	22 Drop 28¼" x 27½"; 22 Fixed 28¼" x 13"
End Sash	1 Drop 18" x 27½"; 1 Fixed 18" x 13" 3 Drop 29½" x 27½"; 3 Fixed 29½" x 13" 2 Fixed 15½" x 38½"; 1 hinged and 1 removable 15½" x 38½"
Storm Sash	22 28½" x 39 3/4"
Front Vestibule - Side Sash	1 Drop 23" x 27½"; 1 Fixed 23" x 13"
End Sash	4 Drop 18" x 27½"; 4 Fixed 18" x 13" 1 Drop 27½" x 27½"; 1 Drop 27½" x 13"
Rear Vestibule - Side Sash	1 Drop 23½" x 27½"; 1 Fixed 23½" x 13"
End Sash	2 Drop 18" x 27½"; 2 Fixed 18" x 13" 1 Drop 28" x 27½"; 1 Drop 28" x 13"
Window Guards	3/8" Brass tubing: 4 15"; 4 17"; 8 18". 2 28" C. B. sockets
Monitor Sash - Side	18 7½" x 27½" Florentine glass
End	Rear 1 7" x 35" Red; Front 1 7" x 52½" Clear
DOORS	
Rear	1 2' 11½" x 6' 1 3/4" single sliding
Front	None
Vestibule	1 22½" x 5' 7" single hinged
GATES	2 pair, opening 33" each
FLOOR	Oak
INTERIOR WOODWORK	Birch
SEATS	
Number, Type and Material	12 Cross 17" x 2' 11"; 2 Side 16¼" x 11' 10"; Rattan
Seating capacity	40
Width of aisle	Front 20½"; Rear 4' 7"
CURTAINS	Cotton crown pattern
STEPS	2 Steel hangers, corrugated steel treads
SIGNALS	
Gongs	1 12" diameter
Conductor Bells	2 4 1/8" diameter
Electric Push buttons	22
LIGHTS	18 36 watt Mazda

AVERY® PV119ED

CAR NO. 986

12-31-1915

GENERAL DIMENSIONS	
Length over Bumpers	45' 2 1/8"
Length over Body	33' 2 5/8"
Width over all	8' 8 3/4"
Height, floor to ceiling	7' 8½"
Height, rail to trolley board	11' 5"
Truck Centers	22' 0"
FRAMING	
Side Sills	5" x 5½" Oak reinforced with 3/8" x 5" plate entire length
End Sills - Rear	5" x 12" Oak and steel, 5/8" x 5" steel plate
Front	5" x 6" Oak and steel, 5/8" x 5" steel plate
Center Posts and End Posts	Ash
VESTIBULE AND PLATFORM	
Length	Front 4' 9"; Rear 4' 8"
Bumper	9" x 13" Oak and steel; ¼" steel plate
Hand Rail	3/4" x 5' 4" brass tube, 3 cast brass sockets
SHEATHING Sides and Ends	9/16" x 2¼" Whitewood
ROOF	
Type and Material	Monitor; Canvas over Whitewood
WINDOWS	
Body - Side Sash	26 Drop 28½" x 25½"; 26 Fixed 28½" x 17"
End Sash	1 Drop 30" x 25½"; 1 Fixed 30" x 17" 1 Fixed 29" x 40½"; 2 Fixed 22" x 40½" 2 Removable 21½" x 40"
Storm Sash	None listed
Front Vestibule - Side Sash	1 Drop 28" x 25½"; 1 Fixed 28" x 17"
End Sash	4 Drop 23½" x 25½"; 4 Drop 23½" x 17" 1 Drop 18" x 25½"; 1 Drop 18" x 17"
Rear Vestibule - Side Sash	1 Drop 28" x 25½"; 1 Fixed 28" x 17"
End Sash	3 Drop 23½" x 25½"; 3 Drop 23½" x 17"
Window Guards	3/8" Brass tubing: 4 21"; 10 23"; 4 27". C. B. sockets
Monitor Sash - Side	22 7½" x 27" Florentine glass
End	2 7½" x 53", 1 Red, 1 Clear
DOORS	
Rear	1 3' 10" x 6' 2" double sliding
Front	1 2' 6½" x 6' 2" single sliding
Vestibule	1 2' 9" x 5' 7" single hinged
GATES	2 pair, opening 33" each
FLOOR	Oak
INTERIOR WOODWORK	Birch
SEATS	
Number, Type and Material	14 Cross 16½" x 3' 11½"; 2 Side 16½" x 14' 8"; Rattan
Seating capacity	48
Width of aisle	Front 20 3/4"; Rear 4' 6"
CURTAINS	Woolen Terry
STEPS	2 Steel hangers, corrugated steel treads, divided by brass hand rail and castings
SIGNALS	
Gongs	1 12" diameter
Conductor Bells	2 4 1/8" diameter
Electric Push buttons	26
LIGHTS	18 36 watt Mazda

CAR NO. 1105

12-31-1915

GENERAL DIMENSIONS	
Length over Bumpers	45' 2 1/8"
Length over Body	33' 2 1/8"
Width over all	8' 8 3/4"
Height, floor to ceiling	7' 8"
Height, rail to trolley board	11' 5"
Truck Centers	22' 1"
FRAMING	
Side Sills	5" x 5½" Oak reinforced with 3/8" x 5" plate entire length
End Sills - Rear	2 8" channels
Front	5" x 12" Oak and steel, 5/8" x 5" steel plate
Center Posts and End Posts	Ash
VESTIBULE AND PLATFORM	
Length	Front 4' 9"; Rear 4' 9"
Bumper	9" x 13" Oak and steel; ¼" steel plate
Hand Rail	3/4" x 5' 4" brass tube, 3 cast brass sockets
SHEATHING Sides and Ends	9/16" x 2¼" Whitewood
ROOF	
Type and Material	Monitor; Canvas over Whitewood
WINDOWS	
Body - Side Sash	26 Drop 28¼" x 25½"; 26 Fixed 28¼" x 17"
End Sash	1 Drop 30" x 25½"; 1 Fixed 30" x 17"
	1 Fixed 28 3/4" x 40¼"; 2 Fixed 21 3/4" x 40¼"
	2 Removable 21 3/4" x 40¼"
Storm Sash	26 29¼" x 41 3/4"
Front Vestibule - Side Sash	1 Drop 28¼" x 25½"; 1 Fixed 28¼" x 17"
End Sash	4 Drop 23 3/4" x 25½"; 4 Drop 23 3/4" x 17"
	1 Drop 18" x 20½"; 1 Drop 18" x 22"
Rear Vestibule - Side Sash	1 Drop 28½" x 25½"; 1 Drop 28½" x 17"
End Sash	3 Drop 23 3/4" x 25½"; 3 Drop 23 3/4" x 17"
Window Guards	3/8" Brass tubing: 4 29"; 10 25"; 4 22½". C. B. sockets
Monitor Sash - Side	22 6 3/4" x 27" Florentine glass
End	2 8" x 54", 1 Red, 1 Clear
DOORS	
Rear	1 3' 10" x 6' 1 3/4" double sliding
Front	1 2' 6 3/4" x 6' 1 3/4" single sliding
Vestibule	1 2' 8 3/4" x 5' 7" single hinged
GATES	2 pair, opening 33" each
FLOOR	Oak
INTERIOR WOODWORK	Birch
SEATS	
Number, Type and Material	14 Cross 17" x 3' 0"; 2 Side 17" x 14' 8"; Rattan
Seating capacity	48
Width of aisle	Front 20 3/4"; Rear 4' 6"
CURTAINS	Woolen Terry
STEPS	2 Steel hangers, corrugated steel treads
SIGNALS	
Gongs	1 12" diameter
Conductor Bells	2 4 1/8" diameter
Electric Push buttons	26
LIGHTS	18 36 watt Mazda

CAR NO. 1131

12-31-1915

GENERAL DIMENSIONS	
Length over Bumpers	45' 9 5/8"
Length over Body	33' 9 1/8"
Width over all	8' 8½"
Height, floor to ceiling	7' 7½"
Height, rail to trolley board	11' 5"
Truck Centers	22' 0"
FRAMING	
Side Sills	22" x ¼" steel plate reinforced with ½" x 3½" x 3½" angles
End Sills	2 8" channels each, Front and Rear
Center Posts and End Posts	Ash
VESTIBULE AND PLATFORM	
Length	Front 4' 9"; Rear 4' 9"
Bumper	9" x 13" Oak and steel; ¼" steel plate
Hand Rail	3/4" x 5' 4" brass tube, 3 cast brass sockets
SHEATHING Sides and Ends	9/16" x 2¼" Whitewood
ROOF	
Type and Material	Monitor; Canvas over Whitewood
WINDOWS	
Body - Side Sash	26 Drop 28½" x 27½"; 26 Fixed 28½" x 17"
End Sash	2 Fixed 28 3/4" x 42½"; 2 Fixed 21 3/4" x 42½"
	2 Removable 21 3/4" x 42½"
Storm Sash	26 29" x 43½"
Front Vestibule - Side Sash	1 Drop 28½" x 27½"; 1 Fixed 28½" x 17"
End Sash	4 Drop 23½" x 27½"; 4 Drop 23½" x 17"
	1 Drop 18" x 20 3/4"; 1 Drop 18" x 24"
Rear Vestibule - Side Sash	1 Drop 28½" x 27½"; 1 Drop 28½" x 17"
End Sash	3 Drop 23½" x 27½"; 3 Drop 23½" x 17"
Window Guards	3/8" Brass tube: 4 20 3/4"; 10 23½"; 4 27 3/4". C. B. sockets
Monitor Sash - Side	22 7" x 27" Florentine glass
End	2 5¼" x 52 3/4", 1 Red, 1 Clear
DOORS	
Rear	1 3' 10" x 6' 1½" double sliding
Front	1 2' 6¼" x 6' 2" single sliding
Vestibule	1 2' 9" x 5' 8¼" single hinged
GATES	2 pair, opening 33" each
FLOOR	Oak
INTERIOR WOODWORK	Birch
SEATS	
Number, Type and Material	14 Cross 17" x 3' 0"; 2 Side 17" x 14' 8"; Rattan
Seating capacity	48
Width of aisle	Front 21½"; Rear 4' 6½"
CURTAINS	Cotton Crown pattern
STEPS	2 Steel hangers, corrugated steel treads
SIGNALS	
Gongs	1 12" diameter
Conductor Bells	2 4 1/8" diameter
Electric Push buttons	28
LIGHTS	18 36 watt Mazda

CAR NO. 1145

12-31-1915

GENERAL DIMENSIONS	
Length over Bumpers	46' 9 5/8"
Length over Body	33' 9 1/8"
Width over all	9' 2½"
Height, floor to ceiling	7' 9¼"
Height, rail to trolley board	11' 6"
Truck Centers	23' 0"
FRAMING	
Side Sills	22" x ¼" steel plate reinforced with ½" x 3½" x 3½" angles
End Sills	2 8" channels each, Front and Rear
Center Posts and End Posts	Ash
VESTIBULE AND PLATFORM	
Length	Front 5' 2½"; Rear 5' 2½"
Bumper	9" x 13" Oak and steel
Hand Rail	3/4" x 5' 4" brass tube, 3 cast brass sockets
SHEATHING Sides and Ends	9/16" x 2¼" Whitewood
ROOF Type and Material	Monitor; Canvas over Whitewood
WINDOWS	
Body - Side Sash	26 Drop 28½" x 27 3/4"; 26 Fixed 28½" x 17"
End Sash	1 Drop 33" x 27 3/4"; 1 Fixed 33" x 17" 1 Fixed 32" x 42"; 2 Fixed 22" x 43" 2 Removable 21½" x 42"
Storm Sash	26 29" x 43½"
Front Vestibule - Side Sash	1 Drop 30" x 27 3/4"; 1 Fixed 30" x 17"
End Sash	1 Drop 29½" x 27 3/4"; 1 Drop 29½" x 17" 3 Drop 25" x 27 3/4"; 3 Drop 25" x 17" 1 Drop 21" x 21"; 1 Drop 21" x 24"
Storm Sash	3 26" x 43"; 2 30½" x 43½"
Rear Vestibule - Side Sash	1 Drop 30" x 27 3/4"; 1 Fixed 30" x 17"
End Sash	1 Drop 30" x 27 3/4"; 3 Drop 30" x 17" 2 Drop 25" x 27 3/4"; 2 Drop 25" x 17"
Window Guards	3/8" Brass tube: 4 21"; 8 25"; 4 29". 2 30" C.B. sockets
Monitor Sash - Side	22 7" x 27½" Florentine glass
End	2 7" x 53", 1 Red, 1 Clear
DOORS	
Rear	1 4' 4" x 6' 2½" double sliding
Front	1 2' 6 3/4" x 6' 1 3/4" single sliding
Vestibule	1 2' 9½" x 5' 9½" single hinged
GATES	2 pair, opening 33" each
FLOOR	Oak
INTERIOR WOODWORK	Birch
SEATS	
Number, Type and Material	24 Cross 16½" x 2' 11½"; 2 Cross 16½" x 18"; Rattan
Seating capacity	50
Width of aisle	27½"
CURTAINS	Woolen Terry
STEPS	2 Steel hangers, corrugated steel treads
SIGNALS	
Gongs	1 12" diameter
Conductor Bells	2 4 1/8" diameter
Electric Push buttons	28
LIGHTS	19 36 watt Mazda

CAR NO. 1211
12-31-1915

GENERAL DIMENSIONS	
Length over Bumpers	46' 9 5/8"
Length over Body	33' 9 1/8"
Width over all	9' 2½"
Height, floor to ceiling	7' 10¼"
Height, rail to trolley board	11' 5"
Truck Centers	23' 0"
FRAMING	
Side Sills	22" x ¼" steel plate reinforced with ½" x 3½" x 3½" angles
End Sills	2 8" channels
Center Posts and End Posts	Ash
VESTIBULE AND PLATFORM	
Length	Front 5' 2½"; Rear 5' 2½"
Bumper	9" x 13" Oak and steel; ¼" steel plate
Hand Rail	3/4" x 5' 4" brass tube, 3 cast brass sockets
SHEATHING Sides and Ends	9/16" x 2¼" Whitewood
ROOF Type and Material	Monitor; Canvas over Whitewood
WINDOWS	
Body - Side Sash	26 Drop 28½" x 27 3/4"; 26 Fixed 28½" x 17"
End Sash	1 Drop 33" x 27 3/4"; 1 Fixed 33" x 17" 1 Fixed 32½" x 42½"; 2 Fixed 22" x 43" 2 Removable 21½" x 42½"
Storm Sash	26 29" x 43 3/4"
Front Vestibule - Side Sash	1 Drop 30" x 27 3/4"; 1 Fixed 30" x 17"
End Sash	3 Drop 25" x 27 3/4"; 3 Drop 25" x 17" 1 Drop 29½" x 27 3/4"; 1 Drop 29" x 17" 1 Drop 21" x 21"; 1 Drop 21" x 24"
Rear Vestibule - Side Sash	1 Drop 29½" x 27 3/4"; 1 Fixed 29½" x 17"
End Sash	1 Drop 30" x 27 3/4"; 3 Drop 30" x 17" 2 Drop 25" x 27 3/4"; 2 Drop 25" x 17"
Window Guards	3/8" Brass tube: 4 21"; 8 24½"; 4 29". 2 30" C.B. sockets
Monitor Sash - Side	22 7½" x 27½" Florentine glass
End	2 5 3/4" x 52 3/4", 1 Red, 1 Clear
DOORS	
Rear	1 4' 4¼" x 6' 2¼" double sliding
Front	1 2' 7" x 6' 2¼" single sliding
Vestibule	1 2' 8 3/4" x 5' 8" single hinged
GATES	2 pair, opening 36" each
FLOOR	Oak
INTERIOR WOODWORK	Birch
SEATS	
Number, Type and Material	14 Cross 16½" x 2' 11½"; 2 Side 17" x 14' 8"; Rattan
Seating capacity	48
Width of aisle	Front 2' 3½"; Rear 5' 0½"
CURTAINS	Cotton Crown pattern
STEPS	2 Steel hangers, corrugated steel treads
SIGNALS	
Gongs	1 12" diameter
Conductor Bells	2 4 1/8" diameter
Electric Push buttons	28
LIGHTS	20 36 watt Mazda

CAR NO. 1279

12-31-1915

GENERAL DIMENSIONS	
Length over Bumpers	46' 7 1/8"
Length over Body	33' 6 5/8"
Width over all	9' 2½"
Height, floor to ceiling	7' 10"
Height, rail to trolley board	11' 5"
Truck Centers	23' 0"
FRAMING	
Side Sills	22" x ¼" steel plate reinforced with ½" x 3½" x 3½" angles
End Sills	2 8" channels each, Front and Rear
Center Posts and End Posts	Ash
VESTIBULE AND PLATFORM	
Length	Front 5' 2 3/4"; Rear 5' 2 3/4"
Bumper	9" x 13" Oak and steel; ¼" steel plate
Hand Rail	3/4" x 5' 4" brass tube, 3 cast brass sockets
SHEATHING Sides and Ends	9/16" x 2¼" Whitewood
ROOF Type and Material	Monitor; Canvas over Whitewood
WINDOWS	
Body - Side Sash	26 Drop 28¼" x 27¼"; 26 Fixed 28¼" x 17"
End Sash	2 Fixed 22" x 42½"; 2 Removable 22" x 42½"
	1 Drop 33½" x 27¼"; 1 Fixed 33½" x 17"
	1 Fixed 32½" x 42½"
Storm Sash	26 28 3/4" x 43 3/4"
Front Vestibule - Side Sash	1 Drop 30" x 27½"; 1 Fixed 30" x 17"
End Sash	3 Drop 25" x 27½"; 3 Drop 25" x 17"
	1 Drop 29½" x 27½"; 1 Drop 29½" x 17"
	1 Drop 21" x 20 3/4"; 1 Drop 21" x 24"
Rear Vestibule - Side Sash	1 Drop 29½" x 27½"; 1 Fixed 29½" x 17"
End Sash	1 Drop 29½" x 27½"; 1 Drop 29½" x 17"
	2 Drop 25" x 27½"; 2 Drop 25" x 17"
Window Guards	3/8" Brass tube: 4 21"; 4 28"; 8 24½". 2 30" C.B. sockets
Monitor Sash - Side	22 7½" x 27½" Florentine glass
End	2 6" x 53", 1 Red, 1 Clear
DOORS	
Rear	1 4' 4½" x 6' 1 3/4" double sliding
Front	1 2' 6 3/4" x 6' 1 3/4" single sliding
Vestibule	1 2' 9" x 5' 8" single hinged
GATES	2 pair, opening 2' 11" each
FLOOR	Oak
INTERIOR WOODWORK	Birch
SEATS	
Number, Type and Material	14 Cross 16½" x 2' 11½"; 2 Side 17" x 14' 8"; Rattan
Seating capacity	48
Width of aisle	Front 2' 4½"; Rear 5' 1½"
CURTAINS	Woolen Terry
STEPS	2 Steel hangers, corrugated steel treads
SIGNALS	
Gongs	1 12" diameter
Conductor Bells	2 4 1/8" diameter
Electric Push buttons	28
LIGHTS	20 36 watt Mazda

CAR NO. 1415

12-31-1915

GENERAL DIMENSIONS	
Length over Bumpers	46' 8"
Length over Body	33' 6 5/8"
Width over all	8' 8 3/4"
Height, floor to ceiling	7' 8"
Height, rail to trolley board	11' 5"
Truck Centers	23' 4"
FRAMING	
Side Sills	22" x ¼" steel plate reinforced with ½" x 3½" x 3½" angles
End Sills	2 8" channels each, Front and Rear
Center Posts and End Posts	Ash
VESTIBULE AND PLATFORM	
Length	Front 5' 3"; Rear 5' 9"
Bumper	9" x 13" Oak and steel; ¼" steel plate
Hand Rail	3/4" x 5' 4" brass tube, 3 cast brass sockets
SHEATHING Sides and Ends	9/16" x 2¼" Whitewood
ROOF Type and Material	Monitor; Canvas over Whitewood
WINDOWS	
Body - Side Sash	26 Drop 28½" x 27 3/4"; 26 Fixed 28½" x 17"
End Sash	1 Drop 33 3/4" x 27 3/4"; 1 Fixed 33 3/4" x 17" 1 Fixed 33¾" x 42"; 2 Removable 21" x 42" 2 Fixed 21½" x 43"
Storm Sash	26 29" x 43½"
Front Vestibule - Side Sash	1 Drop 29½" x 27 3/4"; 1 Fixed 29½" x 17"
End Sash	1 Drop 29½" x 27 3/4"; 1 Drop 29½" x 17" 3 Drop 25" x 27 3/4"; 2 Drop, 1 Fixed 25" x 17" 1 Drop 22" x 20 3/4"; 1 Drop 22" x 24"
Rear Vestibule - Side Sash	1 Drop 29½" x 27 3/4"; 1 Fixed 29½" x 17"
End Sash	1 Drop 29½" x 27 3/4"; 1 Drop 29½" x 17" 2 Drop 27" x 27 3/4"; 1 Drop, 1 Fixed 27" x 17"
Window Guards	3/8" Brass tube: 4 20"; 8 27"; 4 28". 2 30" C.B. sockets
Monitor Sash - Side	22 7½" x 27 3/4" Florentine glass
End	2 7½" x 53", 1 Red, 1 Clear
DOORS	
Rear	1 4' 7¼" x 6' 2" double sliding
Front	1 2' 6 3/4" x 6' 2" single sliding
Vestibule	1 2' 8 3/4" x 5' 8½" single hinged
GATES	3 pair, opening 2' 4" each
FLOOR	Oak
INTERIOR WOODWORK	Birch
SEATS	
Number, Type and Material	14 Cross 16½" x 2' 11½"; 2 Side 16½" x 14' 8"; Rattan
Seating capacity	48
Width of aisle	Front 2' 6"; Rear 5' 3½"
CURTAINS	Woolen Terry
STEPS	2 Steel hangers, corrugated steel treads
SIGNALS	
Gongs	1 12" diameter
Conductor Bells	2 4 1/8" diameter
Electric Push buttons	28
LIGHTS	20 36 watt Mazda

CAR NO. 1579

12-31-1915

GENERAL DIMENSIONS	
Length over Bumpers	46' 8"
Length over Body	33' 7 3/4"
Width over all	9' 1"
Height, floor to ceiling	7' 10½"
Height, rail to trolley board	11' 5"
Truck Centers	23' 4"
FRAMING	
Side Sills	22" x 1/8" steel plate reinforced with 3/8" x 3½" x 3½" angles
End Sills	1 8" channel and ¼" x 8" plate
Center Posts and End Posts	Ash
VESTIBULE AND PLATFORM	
Length	Front 5' 3"; Rear 5' 8 3/4"
Bumper	7" x 13" Oak and steel; ¼" steel plate
Hand Rail	3/4" x 5' 3" brass tube, 3 cast brass sockets
SHEATHING Sides and Ends	9/16" x 2¼" Whitewood
ROOF Type and Material	Monitor; Canvas over Whitewood
WINDOWS	
Body - Side Sash	25 Drop 28 3/4" x 27½"; 25 Fixed 28 3/4" x 17" 1 Fixed 28¼" x 42½"
End Sash	1 Drop 28 3/4" x 27½"; 1 Fixed 28 3/4" x 17" 1 Fixed 38½" x 42½"; 2 Fixed 21" x 42½" 2 Removable 21" x 42½"
Storm Sash	25 28 3/4" x 27¼"
Front Vestibule - Side Sash	1 Drop 29½" x 27½"; 1 Fixed 29½" x 17"
End Sash	1 Drop 29½" x 27½"; 1 Drop 29½" x 17"; 1 Drop 26" x 27½"; 1 Drop 26" x 17"; 2 Drop 25½" x 27½"; 2 Drop 25½" x 17"; 1 Drop 22¼" x 20 3/4"; 1 Drop 22¼" x 23 3/4"
Rear Vestibule - Side Sash	1 Drop 29½" x 27½"; 1 Fixed 29½" x 17"
End Sash	1 Drop 29½" x 27½"; 1 Drop 29½" x 17"; 2 Drop 27½" x 27½"; 1 Drop 27½" x 17"; 1 Fixed 27½" x 17"
Window Guards	3/8" Brass tube: 4 20"; 8 27"; 6 29½". C.B. sockets
Monitor Sash - Side	22 7½" x 28" Florentine glass
End	2 7½" x 53½", 1 Red, 1 Clear
DOORS	
Rear	1 4' 7½" x 6' 2¼" double sliding
Front	1 2' 6 3/4" x 6' 2" single sliding
Vestibule	1 2' 8¼" x 6' 3" single sliding
GATES	3 pair, opening 2' 4" each
FLOOR	Oak
INTERIOR WOODWORK	Birch
SEATS	
Number, Type and Material	14 Cross 17" x 3' 11½"; 2 Side 17" x 14' 8"; Rattan
Seating capacity	48
Width of aisle	Front 2' 6"; Rear 5' 4"
CURTAINS	Woolen Terry
STEPS	2 Steel hangers, corrugated steel treads
SIGNALS	
Gongs	1 12" diameter
Conductor Bells	2 4 1/8" diameter
Electric Push buttons	28
LIGHTS	20 36 watt Mazda

New Type of Car for Twin Cities

Equipment Which Is Being Tried for Rush-Hour Service Has 26-In. Wheels, Inside Journals, a Low Floor and a Weight of 14 Tons

The Twin City Rapid Transit Company is experimenting with a two-car unit for rush-hour service that is made up of cars of a new type designed by W. J. Smith, master mechanic, and built in the company's shops.

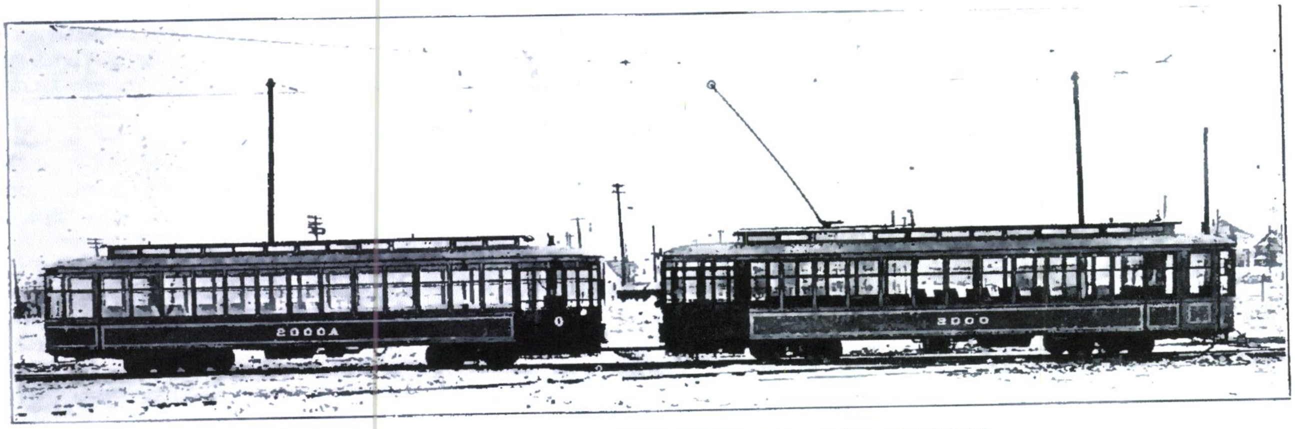
Each of the new cars in the unit is equipped with four GE-258, 25-hp. motors, and 26-in. Davis wheels. The trucks are very light, with arch-bar side frames and a 4 ft. 8 in. wheelbase, and the journals have been placed between the wheels, thus reducing the length of transom and bolster necessary with the customary arrangement of having the side frames outside of the wheels. The brakes are of a specially designed band type.

The level of the car floor is 31 in. above the rail. The car body is 46 ft. long by 9 ft. wide, and in outward appearance is similar to the Twin City Lines standard, except that it is not so high. For the vestibules there have been provided folding doors with wireglass panels in their upper part. These doors are operated by the same type of mechanism that is used for the company's standard folding wire, platform gates. However, the doors will be operated by the conductor instead of by the motorman, as is the rule on the present type of cars.

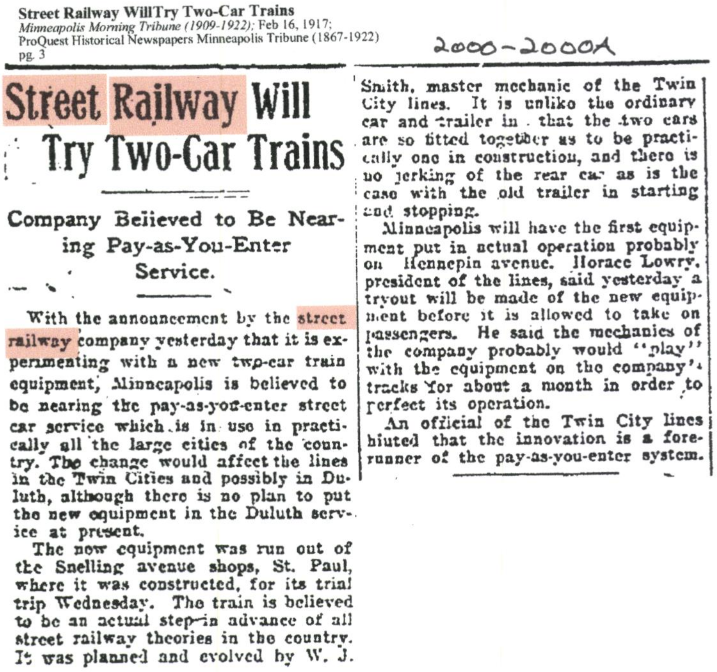
A different body arrangement has been adopted for the two cars making up the unit, the front car having rear entrance and exit and the rear car front entrance and exit. The front car seats forty-seven passengers, and rear car fifty-four. Both cars are permanently coupled together, and the rear car is not equipped with control, all eight motors being operated by one controller on the front car. A hollow steel coupling carries the power line, air hose, bell wires, etc.

The total weight of the unit of two cars, fully equipped for operation is 55,500 lb., this including double sash for both cars. The present standard Twin City car weighs complete 42,000 lb. when equipped with four GE-200, 40-hp. motors. For comparison, two such cars in a train would weigh 84,000 lb. and would seat ninety-six passengers, while the new unit weighing 55,500 lb. seats 101 passengers. One of the new trucks, complete with motors, wheels and brake equipment, weights 5200 lb.

The company expects to adopt the type of car used in the front of this unit as its new standard. If operation proves successful, more double units will be built for use in the rush hour.



UNIT OF TWO LOW-FLOOR CARS BEING TRIED OUT ON TWIN CITY LINES



Street Railway WillTry Two-Car Trains
Minneapolis Morning Tribune (1909-1922); Feb 16, 1917;
ProQuest Historical Newspapers Minneapolis Tribune (1867-1922)
pg. 3

2000-2000A

Street Railway Will Try Two-Car Trains

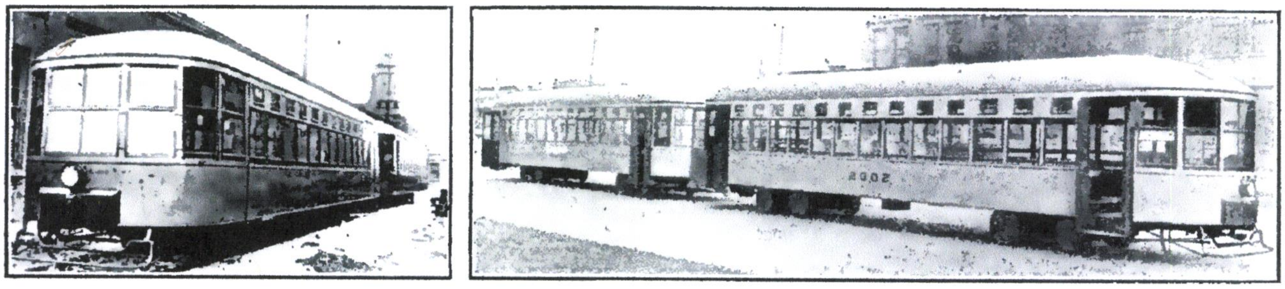
Company Believed to Be Nearing Pay-as-You-Enter Service.

With the announcement by the street railway company yesterday that it is experimenting with a new two-car train equipment, Minneapolis is believed to be nearing the pay-as-you-enter street car service which is in use in practically all the large cities of the country. The change would affect the lines in the Twin Cities and possibly in Duluth, although there is no plan to put the new equipment in the Duluth service at present.

The new equipment was run out of the Snelling avenue shops, St. Paul, where it was constructed, for its trial trip Wednesday. The train is believed to be an actual step in advance of all street railway theories in the country. It was planned and evolved by W. J. Smith, master mechanic of the Twin City lines. It is unlike the ordinary car and trailer in that the two cars are so fitted together as to be practically one in construction, and there is no jerking of the rear car as is the case with the old trailer in starting and stopping.

Minneapolis will have the first equipment put in actual operation probably on Hennepin avenue. Horace Lowry, president of the lines, said yesterday a tryout will be made of the new equipment before it is allowed to take on passengers. He said the mechanics of the company probably would "play" with the equipment on the company's tracks for about a month in order to perfect its operation.

An official of the Twin City lines hinted that the innovation is a forerunner of the pay-as-you-enter system.



VIEWS OF BOTH SIDES OF THE TWIN CITY RAPID TRANSIT COMPANY'S TWO-CAR TRAIN

Two-Car Train Weighs 490 Lb. per Seat

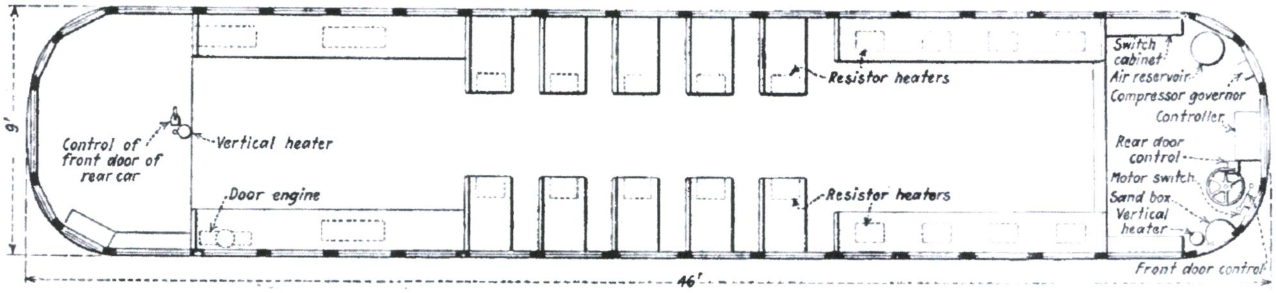
Experimental Two-Car Unit, Built by the Twin City Rapid Transit Company, Weighs 51,500 Lb. and Seats 105 Passengers—Has Low-Floor, Inside-Journal Bearings, Trucks Equipped with Band Brakes and Front Car Heated with Resistors

ONE of the big transportation problems that has arisen in St. Paul, Minn., during the past few years has been to route a sufficient number of cars through the congested business district in rush hours to remove the people from the street corners. On the basis that the solution rested not in adding to the number of cars, which would further aggravate the accentuated traffic conditions, but in increasing the size of each unit, the Twin City Rapid Transit Company has constructed a two-car train of new design. It is believed that train operation will prove a long step forward in the handling of travel on the heavy traffic lines in St. Paul. The operating results of this completed train on several of the heaviest traveled lines radiating from the business center of St. Paul has been so satisfactory that the company intends to construct a number of its future cars along the same general lines and use them on the denser traffic lines in Minneapolis.

The train consists of two motor cars, permanently connected by the tubular coupler. Each car is 9 ft. wide outside and 8 ft. 6 in. wide inside. Both cars are 46 ft. long and the over-all length of the train is 94 ft. The rear car seats fifty-seven people and the front one forty-eight people, a total seating capacity for the train of 105 people. The two-car unit weighs 51,500 lb., although it is hoped to incorporate refinements in future cars which will reduce the weight to about 23,000 lb. per car. Thus in the first design the low weight of 490 lb. per seat has been attained and if the contemplated design perfections are possible and feasible this feature will be reduced to about 438 lb.

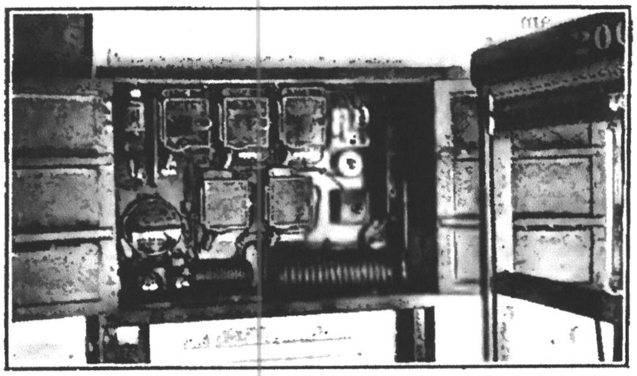
LOW-FLOOR INSIDE-JOURNAL TRUCKS

Numerous departures from standard practice have been resorted to in order to make the unit capable of swallowing a street corner crowd. With this purpose



PLAN OF THE FRONT CAR OF THE TWIN CITY TWO-CAR TRAIN

BOTH FRONT AND REAR CARS HAVE AMPLE AISLE WIDTH AND STANDING ROOM



CHOKE COIL, LIGHTNING ARRESTER, SWITCHES, ETC., GROUPED IN A CABINET ON THE LEFT SIDE OF THE FRONT PLATFORM

in view, standing room is liberal, doors are wide and the steps and car floor are low. The low floor height of 32 in. is the result of a specially designed truck having inside journals and band brakes and two 25-hp. safety car motors. The wheels are 26 in. in diameter and are mounted on hollow axles. The use of the compact safety car motor and the inside journal has left ample room for an 8-in. brake drum on each axle. The brake drum and band are not unlike the drive-shaft type in use on heavy duty automobile trucks. The elimination of brakeshoes has made for quiet operation and smooth stopping. Since a more durable material is used, the small amount worn away with raybestos lined hand brakes will insure that adjustments and replacements will be less frequent than with cast-iron brakeshoes bearing directly on the wheel tread. The additional life of the wheel was also a factor that was considered in the use of this type of brake. The truck bolster is supported by two full elliptical transverse springs the ends of which extend between the wheels. Placing motors on these trucks is carrying one step further the development of the inside-journal, low-floor trucks, which have been experimentally worked out in trailer operations during the past few years.

SEATS ARRANGED TO PREVENT CONGESTION

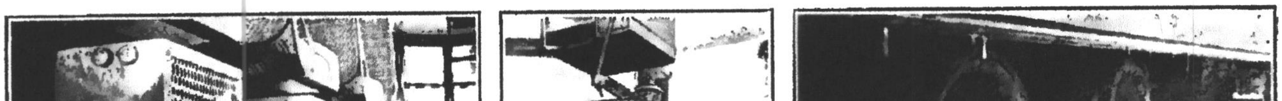
The seating arrangement and floor plans are shown in the accompanying drawing. Ten rattan cross seats of the non-reversible type with full spring cushions and thin backs are provided in each car. Longitudinal seats are placed at the ends to allow standing room and space for the movement of passengers. The platforms are dropped about 8 in. from the floor level and the step height is about 10 in. The step itself is about 14 in. above the top of the rail. Large loading platforms and low step heights were considered necessary to facilitate the speedy boarding of passengers. These cars have been provided with substantial double insulated floors and double sides up to the window line. The arch roof has a double ceiling and the windows are fitted with double sash. Instead of roof ventilators, ports with sliding glasses in cast aluminum frames have been placed above each window. The glass itself is held rigidly in the frame against a wicking insert by four brass fingers. The port can be opened and closed by means of a small knob inserted through a hole bored in the center of the window.

RHEOSTATIC HEATING USED

The resistors for the motors of both cars are used to heat the first car. A grid unit is bolted to the car floor under the end of each cross seat and four under each of the forward bench seats. Each grid is protected on the end and top by a metal housing, and the two sides are covered with a pressed metal grating to allow air circulation. Additional coil heaters to supplement if necessary the rheostatic heating have been placed under the rear bench seats, a vertical heater on the farebox stanchion on the rear platform and another against the car front forward of the front exit door. The rear car is completely equipped with standard electric coil heaters.

UNIQUE SCHEME OF DOOR CONTROL

The scheme of door control is distinctly unique. The double set of rear doors of the forward car are opened and closed by a door engine, the electric control for which is located beside the main controller at a convenient height for the motorman. The motorman operates it with his knee, and a mirror on the corner post enables him to see when all passengers have boarded. A similar knee-operated control mounted on the farebox stanchion of the first car and operated by the conductor opens and closes the front exit doors of the rear car. The doors at each end of the train are mechanically



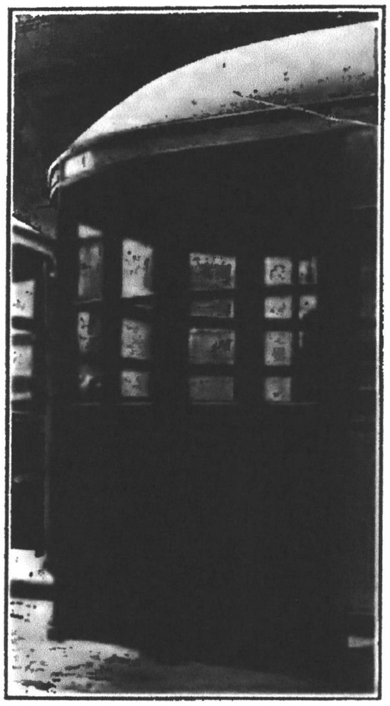
RESISTORS USED TO HEAT CARS IN ST. PAUL

Nos. 1 and 2—All of the grid heaters are placed under the ends of cross seats and beneath the front bench seats.

No. 3—The electro pneumatic control of the front exit of the rear car and auxiliary heaters are placed on the farebox stanchions.

No. 4—The trucks have inside journals, band brakes and 26-in. wheels.
No. 5—Close-up of coupler connection.

operated by the conductor of the rear car and the motorman. Thus it is seen that each car is arranged as a rear-entrance, pay-enter, front-exit unit. The purpose of this method of door control was to divide the work more evenly among the three men and reduce the time occupied by these operations. Thus the two conductors are responsible for one door each while they are taking fares, and the motorman, otherwise idle when the train is not in motion, is operating two doors.



AMPLE DOUBLE ENTRANCE DOORS INCLOSE THE STEPS

Both conductors give their starting signals directly to the motorman by buzzers having distinctive sounds. Both of these are distinguishable from the stopping signal given by the passengers.

Practically all of the control and auxiliary equipment has been brought together on the front platform of the first car. Besides the controller for the motors of both cars, the air reservoir, the compressor governor, sand box, switch cabinet, etc., are arranged as shown in the car layout. The cabinet contains the choke coil lightning arrester, main switch, heater, pump, light, door control, switches, etc. Each car has an individual compressor attached to the under side of the body and the reservoir for the rear car is placed on end in the front platform, where the absence of other auxiliary equipment allows room for the end seat.

TUBULAR COUPLER CARRIES MOTOR CABLES AND AIR CONNECTIONS

The method of permanently and safely coupling the two cars together has been worked out in a new way. The train connection is a tubular steel coupler through which are run the motor cables, bell wires and air hose. The connector is swiveled to each car through a four-legged frame riveted to the steel under-framing. An accompanying illustration shows the construction and fastening of the coupler. Both cars are equipped with emergency air valves which automatically apply the air in case the train connections should be broken.

Since the trial of this train began early last fall, it has lived up to its expectations in its ability to expedite rush-hour travel. Its operation has not been confined to one route; on the other hand, it has been operated on all of the downtown lines and at extreme peak-load traffic periods. At times over 250 passengers have been carried on one trip. Since there are no bulkheads, congestion has been moderated by the elimination of doors between the car body proper and the front and rear vestibules. This arrangement makes it easy for passengers to enter or leave the car and avoids congestion at the door opening. Such a condition is also alleviated by the ample design of the platform, for the body does not converge to the front from the end posts. The wide entrance doors also facilitate speedy loading. These cars are provided with wooden doors instead of wire gates, as has been the practice of the Twin City Rapid Transit Company in the construction of its city cars. Practically all the company's equipment consists of heavy single-end cars having an open rear platform, the steps of which are inclosed by either two or three double-folding wire gates.

Office DEPOT.

New Street Car Train Built by Lowry Firm
Minneapolis Morning Tribune (1909-1922); Oct 23, 1921;
ProQuest Historical Newspapers Minneapolis Tribune (1867-1922)
pg. A8

New Street Car Train Built by Lowry Firm

Construction Represents the Latest Word in Trolley Line Equipment.

General Operation Will Start When Litigation Is Settled, Official Says.

After two years' study by its engineers, the Minneapolis Street Railway company has built a two-car trolley train which Horace Lowry, president, declares is the latest word in car construction for the handling of travel on heavy traffic lines.

Minneapolis and St. Paul city officials were invited to witness the first demonstrations of the new two-car train last week. They were unanimous in asserting that the use of trains of this character will go a long way toward improving service in both cities.

Litigation Blocks Program.

Mr. Lowry said the company will begin building trains of the new type in its own shops as soon as the rate litigation is settled and the company is able to finance the construction.

The two cars of the train are connected by means of a steel tube coupler, which carries the motor wires, bell wires and air hose from one car to another. Both cars are provided with emergency air valves which automatically apply the air, should the train connection become broken. Each car also is provided with hand-brakes.

Two trucks with 26-inch wheels are under each car. The wheels are equipped with hand-brakes built on the same principle as automobile brakes. This will eliminate the necessity of brake shoes and make for more quiet operation. On each axle there is a 24-horsepower motor.

Engine Controls Doors.

The rear doors of the front car are opened and closed by an electric engine controlled by the motorman. The front doors of the rear car are operated by an electric sign controlled by the conductor on the front car. The other two doors are operated mechanically by the motorman and conductor.

The cars are nine feet wide outside and eight feet and six inches wide inside. Both cars are 46 feet in length and the two-car train is 94 feet long. The distance from the rail to the car floor is 32 inches.

At the rear entrance and front exit there are two steps. The cars have been provided with glass doors instead of wire gates. There are no doors between the rear vestibule and the car body proper or between the car body and front vestibule. This arrangement makes it easy for passengers to enter or leave the car and avoid congestion at the door opening.

Train Seats 105.

The rear car seats 57 passengers and the front car 48, making a total seating capacity of 105 passengers for the train.

The train is electrically heated and provision has been made for ample ventilation. The car is equipped with special small windows over each seat, making it possible for the passengers to regulate ventilation themselves. The design adapts itself especially to keeping the cars clean.

The cars have been built light to make it possible to accelerate and brake rapidly. They have a complete steel frame, including roof construction. Wood has been used in the floors, walls and roof for enclosing purposes. Double insulated floors and double sides up to the windows are provided. The roof has a double ceiling and the cars are provided with double windows for cold weather.

CONSTRUCTION OF MINNEAPOLIS LIGHT-WEIGHT TRAINS

All of the various types of construction so far described have been designed to obtain minimum weight and structural simplicity, while at the same time providing a construction which would have the strength and rigidity required to stand up satisfactorily in service. As previously pointed out, it is apparent in each design that the general arrangement of the entire structure has been built more or less around the particular type of side post and girder arrangement selected. Since the advent of the plate girder type of construction it has been the practice to fasten the girder plate on the outside of the body side posts below the belt rail and then to provide some sort of finish on the interior.

In the type of construction adopted

on the sample light-weight train built in Minneapolis, this arrangement is not followed. The side posts are of 1½-in. x ⅞-in. x ⅛-in. continuous rolled-steel channels installed with the flanges turned out and extending continuously over the car from

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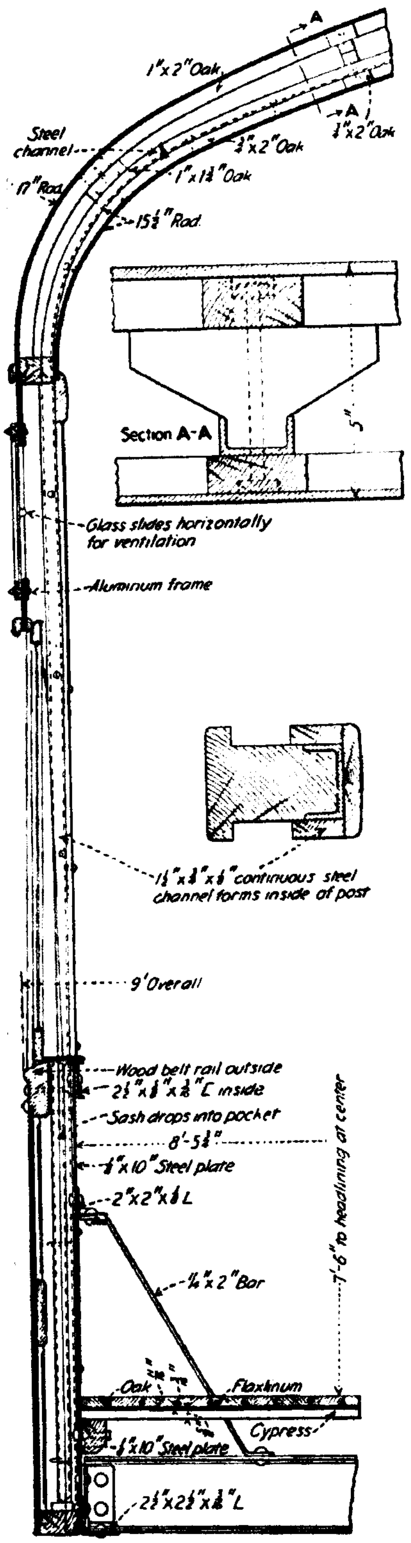
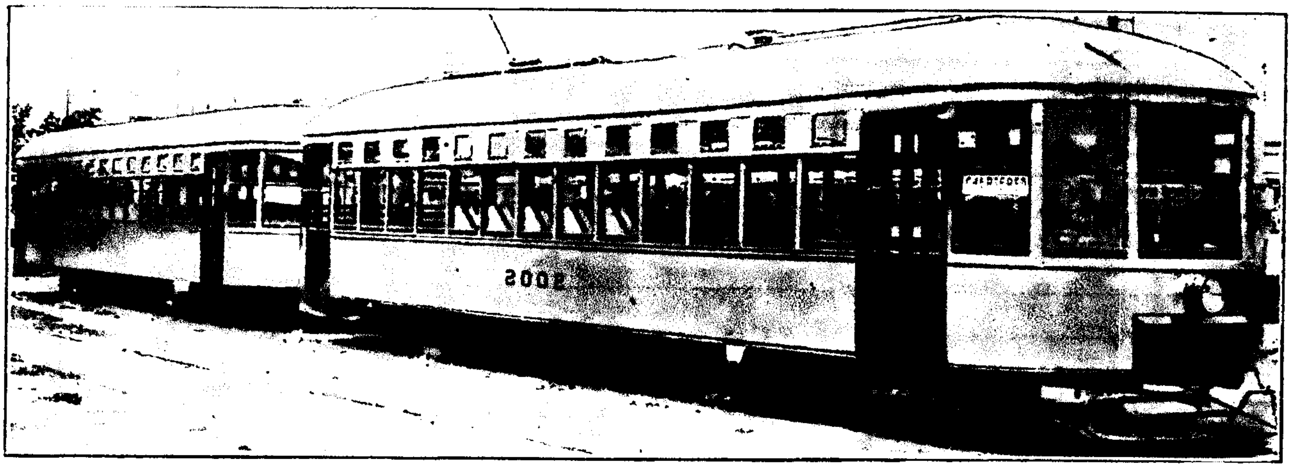


Cross-Section of Minneapolis Car Shows Channel Side Post Construction



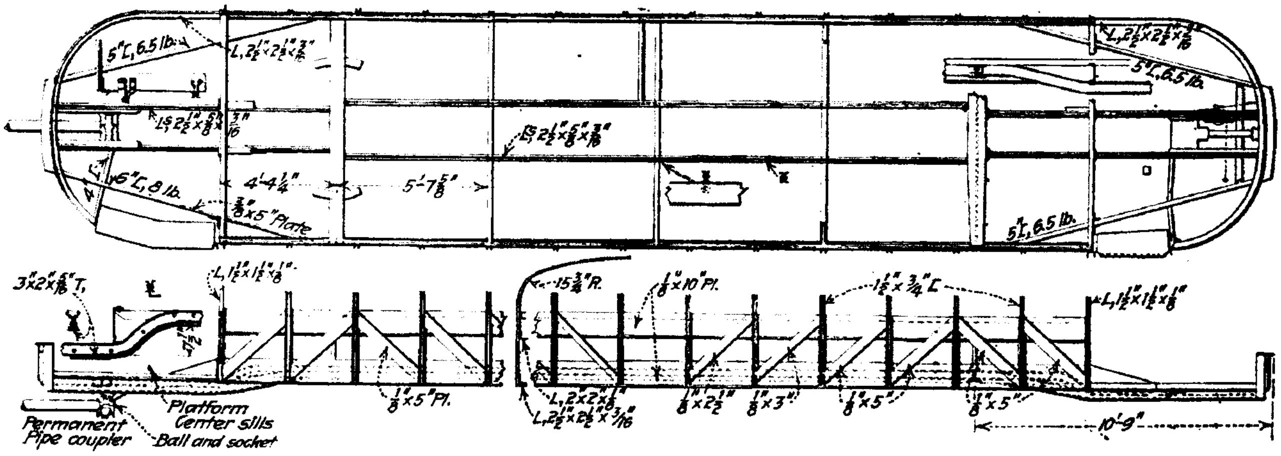
In the Light-Weight Minneapolis Train the Outside Panels and Top Sash Are Made of Plywood Fastened to Wood

side sill to side sill. Flat steel plates, ¼ in. x 10 in., are riveted across the post channels on the inside, one plate at the belt rail and a second plate at the lower side-sill angle. Diagonal flat braces, which are designed in accordance with the loads imposed and vary in size from 2½ in. x ⅛ in. to 5 in. x ⅛ in., are riveted from post to post across the backs of the channels between the belt rail and side-sill angle. The belt rail is also placed on the inside and is made of 2½-in. x ⅝-in. x 3/16-in. channel riveted across the backs of the side-post channels. Wood posts are fastened on the outside of the steel members and are let in between the channel flanges. A wood member along the belt rail and a wood intermediate rail are fastened on the outside of these fillers. The outside lower panels are 5/16-in. plywood material and are screwed and glued to the wood rails and posts. In general appearance, with the exception of the lack of rivets, the completed side resembles a steel plate after it is painted.

A lower side-sill angle 2½ in. x 2½ in. x 3/16 in. forms a support for the cross sills. It will be noted in connection with the type of construction employed that an over-all width of 9 ft. allows the use of the comparatively thick wall section adopted without interfering with the provision of ample aisle and seat width.

The customary upper sash is considerably modified on these cars. No letterboard is used. A continuous panel of 5/16-in. plywood is glued to the side posts between the roof line and the top of the lower sash, and rectangular cast aluminum frames containing glass openings about 8 in. x 14 in. are set into this plywood panel between each pair of side posts. The glass in these frames is arranged to slide horizontally. This enables a ventilating opening to be provided. This arrangement is discussed more fully in another chapter dealing with ventilation.

The underframe structure also presents an interesting feature in that the cross-sills are set at relatively infrequent intervals compared with general practice, and a pair of double channel center sills are run the length of the car to support the ⅝-in. lower cypress floor which is laid crosswise and upon which a layer of 3/16-in. insulating material and then an 1⅛-in. tongue and groove oak floor is laid longitudinally. An accompanying illustration shows details of the underframe structure.



The Steel Framing of the Minneapolis Light-Weight Cars Is of a Trussed Type, with the Steel Members on the Inside of Car

Office DEPOT.

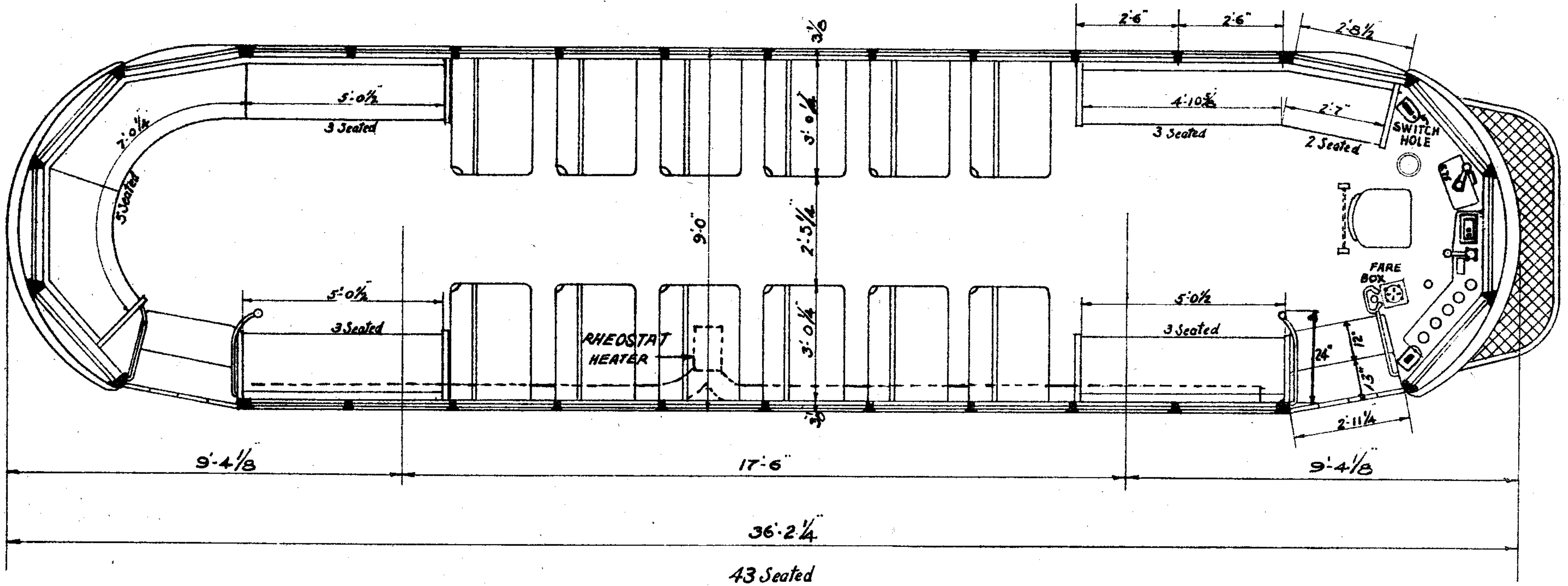
DUUTH AND STILLWATER CARS
LUMBER SCHEDULE
1924-1925

BODY

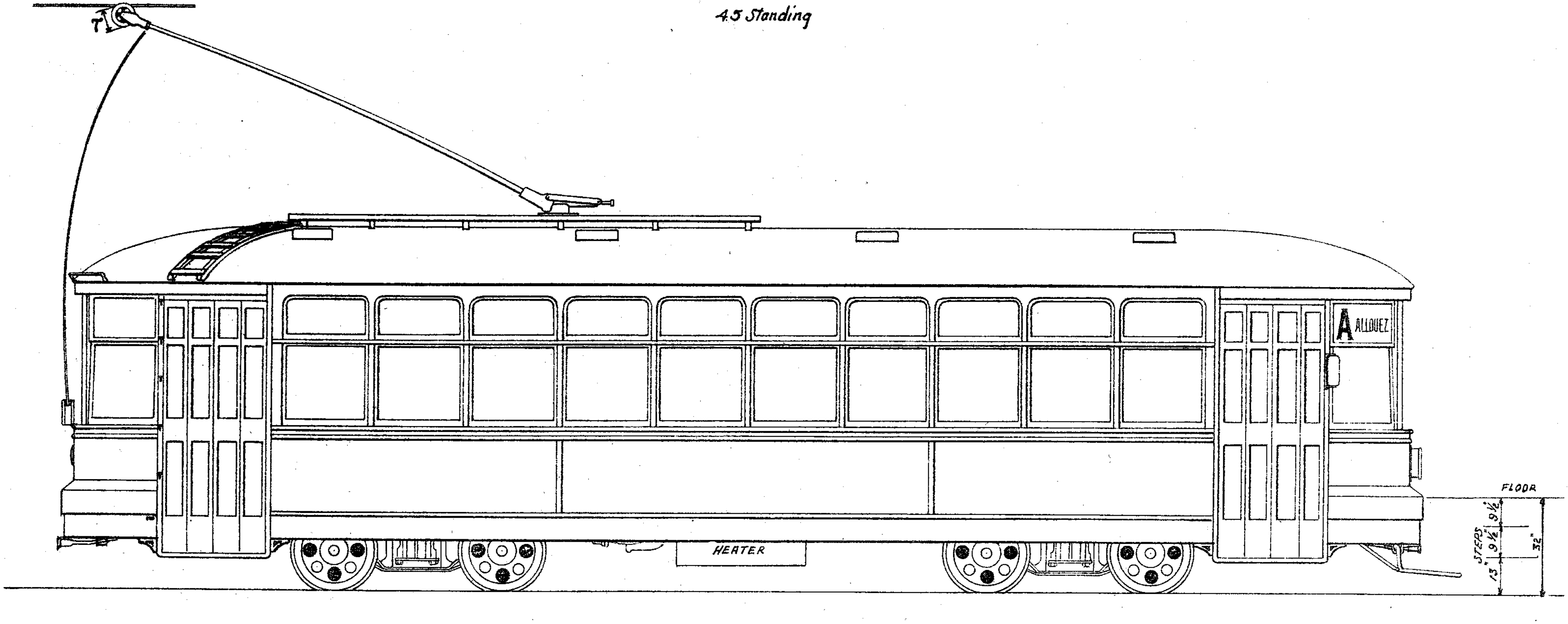
- White Oak
    - Side Sill (continuous around car)
    - Plates
    - Rafters
    - All Posts
    - Bumpers
    - All Exterior Molding (except Lower Drip Molding on Upper Sash)
    - Floor
    - Floor-Top Boards
    - Nailing Strip
    - Water Table
    - Trolley Board Cleats
- Magnolia
    - Lower Drip Molding on Upper Sash
    - Upper Sash
    - Doors
- Mahogany
    - Window Flap
    - Lower Sash (sides of car only)
    - Pilasters
    - Window Stops
    - All Interior Molding
- Cypress
    - Floor - Bottom Boards
- Whitewood
    - Purlins
    - Longitudinal Roof Ties
- Poplar
    - Rafter Fillers
- Georgia Pine
    - Trolley Board
- Haskelite
    - Outside Sheathing 3/8"
    - Roof 1/4"
    - Headlining 3/16"

VESTIBULES

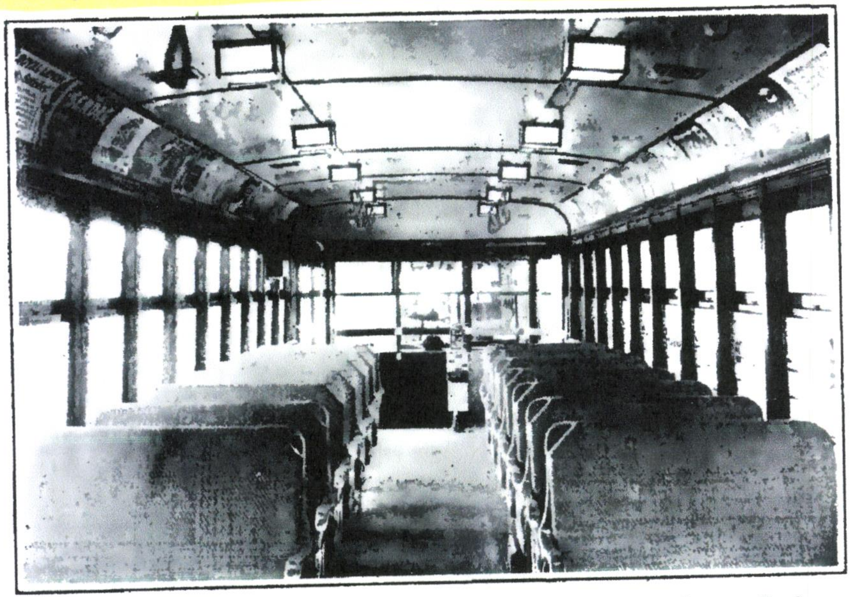
- White Oak
    - Bumper Filler
    - Water Table
    - Rafters
    - Hood Rim
    - Facia
- Magnolia
    - Sash (Lower and Upper)
- Mahogany
    - Window Stool
- Whitewood Strips
    - Roof
- Agasote
    - Headlining
- Haskelite
    - Dash 3/8"
    - Inside Panel 3/8"


2'6"
2'6"
2'8½
3'0
5'0½
3 Seated
7'0¼
5 Seated
3'0¼
9'0
2'5¼
4'10⅝
3 Seated
2'7"
2 Seated
SWITCH HOLE
FARE BOX
5'0½
3 Seated
RHEOSTAT
HEATER
3'0¼
5'0½
3 Seated
24"
12"
13"
2'11¼
3'0
9'4⅛
17'6"
9'4⅛
36'2¼"

43 Seated
45 Standing


7"
A
ALLOUEZ
HEATER
FLOOR
STEPS
13"
9½"
9½"
32"

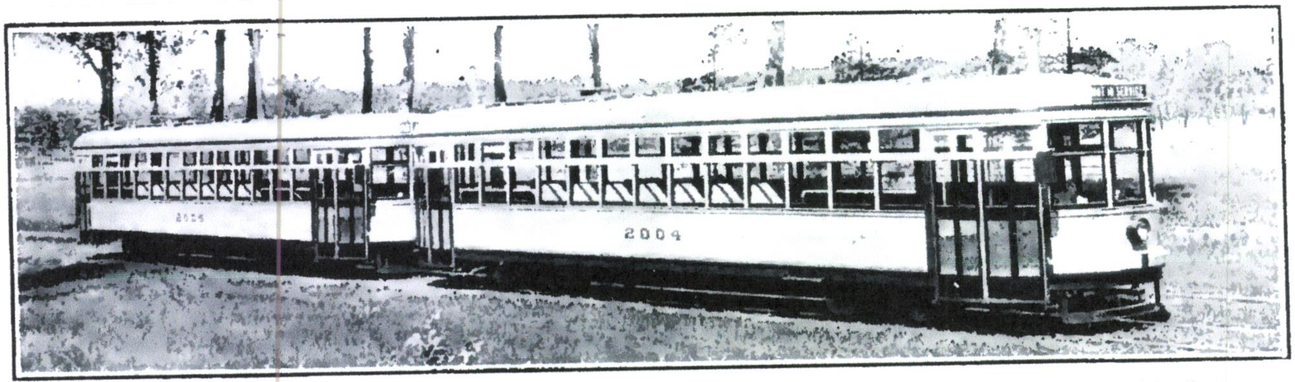
Comprehensive Tests Being Given Two-Car Trains in Twin Cities



Interior of the New Twin City Car, Showing Type of Lighting Fixtures Used

As was briefly stated in the issue of ELECTRIC RAILWAY JOURNAL for Aug. 7, the streets of Minneapolis and St. Paul, Minn., are being used as laboratories for the testing of a two-car train unit recently constructed by the Twin City Rapid Transit Company. It is desired by the company to know how effectively the double unit may be employed in handling the peculiar rush-hour traffic problems which are encountered in the communities which it serves.

A number of unusual features are embodied in the construction of the trial cars. The lighting fixtures shown in the accompanying interior view provide an exceptionally good illumination and the extra window space also adds to the brightness of the cars.



Two-Car Train Now Being Operated by the Twin City Company to Determine Its Feasibility for Permanent Adoption

ERJ
7-3-1926

Noiseless Car Is Exhibited

As a means of increasing public interest in transportation affairs, the Twin City Rapid Transit Company, Minneapolis, Minn., recently entered one of the noiseless street cars which it plans to put in service in the Twin Cities in the St. Paul Products Show, recently held at one of the St. Paul department stores. This show inaugurated the home products display and sales plan being conducted in the Minnesota city. The car that was exhibited weighs approximately 25,000 lb., is equipped with noiseless roller bearings and brake bands, as well as an improved type of spring to insure a maximum of easy and quiet riding.

ERJ
8-7-1926

Two-Car Train Constructed by Twin City Company

Experiments are being conducted with a light-weight two-car train recently built by the Twin City Rapid Transit Company, Minneapolis, Minn. One of these cars was recently demonstrated in the Home Products Show held in St. Paul and mentioned briefly in the issue of ELECTRIC RAILWAY JOURNAL for July 3. It is planned to place additional units such as those which constitute this train into service in the Twin Cities, with certain modifications in their general construction, if the results of the tests now being conducted are satisfactory.

ERJ 11-24-1927

Minneapolis' 25 New Units to Go Into Service Dec. 1

Twenty-five new street cars of the most modern type in street railway equipment it is reported will be put in service in Minneapolis and St. Paul, Minn., Dec. 1 by the Twin City Rapid Transit Company. Mention of these cars was made in the JOURNAL March 12 and Sept. 24.

The cars, which are now under construction at the company's plant at University and Snelling Avenues, will cost $300,000. They will be the first of a number which, it is understood, will be used to replace the present cars and each of them will seat 50 persons, 28 of them on cross-wise seats and the balance on the side seats. The cars will be light in weight and attention has been given to reduction of noise. They can be operated either as one-man or two-man type cars. The bodies are lower than the cars now in use; they have a long, rakish appearance, due to the rounding of both the front and rear ends, and have stream lines. The frames are constructed of steel and duraluminum and the sides of wood. The reason wood instead of steel was employed, according to W. J. Smith, master mechanic of the street railway company, is because of its lighter weight, minimum of vibration and insulation qualities for keeping out both heat and cold. The seats are built on more of a slant than those now commonly in use and it is claimed are more comfortable and provide greater legroom for the passengers. The rear of the seat is protected by an aluminum piece to prevent soiling of the passengers' clothing by the feet of those seated in the back. The cars are heated by electric heaters and are so designed as to provide increased light for reading and reduce the glare and shadow to a minimum.

"The company has not yet determined just what lines the cars will be operated over, but it is quite certain that they will be divided between Minneapolis and St. Paul," Mr. Smith said. "In designing these cars we have striven to make a practical, safe car which would include beauty of design and such refinements as would attract passengers and make them feel just as much at home in our cars as they would in their own automobiles."

◆

New Twin City Cars in Operation

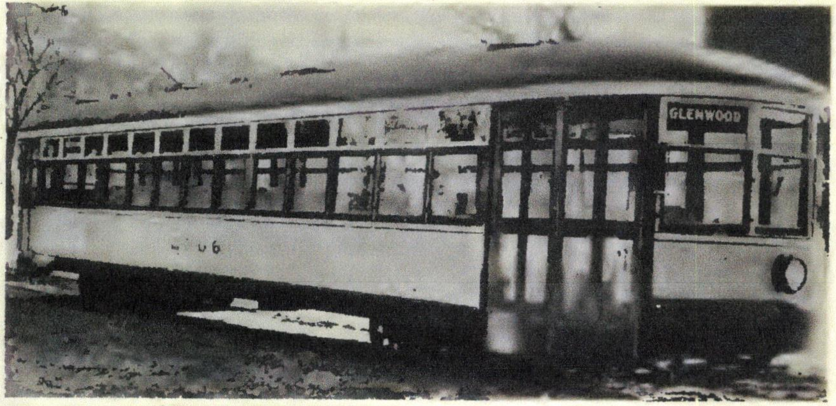
The Twin City Rapid Transit Company, Minneapolis, Minn., has put in operation 25 new street cars. The cars are of the light-weight, noiseless type built in the Snelling shops of the company.

The car body is built on a steel and duralumin frame weighing 4,230 lb. In addition to this metal frame, the car has a complete frame of white oak. The ceiling, roof and sides of the car are plywood and the vestibule linings are plymetl. The floor is double and well insulated and the inside finish is mahogany with a white ceiling.

The trucks are each equipped with 56 coil and elliptic springs and a swinging spring plank giving a perfect graduation of the load and eliminating vibration.

With this car having a normal load, it is possible to reach a speed of 21 m.p.h. and to come to a stop within 600 ft. in 26 seconds.

The interiors of these cars are in mahogany finish with a white ceiling. They are well lighted and ventilated



One of the light-weight, noiseless type cars put in operation by the Twin City Rapid Transit Company

Name of railway	Twin City Rapid Transit Company
City and state	Minneapolis, Minn.
Number of units	25
Type of unit	one-man, two-man, double-end
Number of seats	50
Weights:	
Car body and equipment	17,983 lb.
Trucks	6,980 lb.
Total	24,963 lb.
Length over all	45 ft. 6 in.
Truck wheelbase	4 ft. 6 in.
Width over all	9 ft. 0 in.
Body	Semi steel
Doors	End
Air brakes	G. E. Concentric Clasp
Armature bearings	Roller
Axles	Tubular
Compressors	G. E.
Control	G. E.
Door mechanism	National Pneumatic
Doors	Folding
Fare boxes	Johnson
Hand brakes	Peacock
Headlights	Ohio Brass
Interior trim	Wood-trim mahogany with aluminum metal trim
Journal bearings	Hyatt roller
Motors	G. E. No. 4
Roof material	Plywood
Seats	Rattan
Wheels, type	Steel, oil tempered, diameter 26 in.

5-26-1928 ERJ listed revisions to the specification. Single End; 4 GE 258K motors; door engines [redacted] Consolidated Car Heating Co.; weights: body 12,100 lbs., trucks 8,200 lbs., equipment 7,738 lbs., total 28,038 lbs.

— PCC CARS —

EXHIBIT # 1 to

CONTRACT of bargain and sale of ninety one (91) streetcars type P.C.C. which is entered into for one part by "Servicio de Transportes Electricos del D. F." represented by its General Director, Mr. Alfonso Sotomayor, C.P.A., and for the other, by the Minneapolis Street Railway Company and The St. Paul City Railway Company, both Minnesota, U.S.A. Corporations, and represented by their President Mr. Fred A. Ossanna.

DESCRIPTION OF THE EQUIPMENT

Car bearing Company number 299, purchased in 1945, has Westinghouse motors and controls, Clark Equipment Company trucks with air operated drum brakes on the armature shaft of each motor and air operated door motors. This car is equipped with Westinghouse type 1432-F motor, weight 35,830 pounds (16.3 Ton.) length 46' (13.7 m), width 8'4"(2.53 m). Details and descriptive data of the car are shown on sheet No. 9 -- which is attached. (NOT INCLUDED)

Cars bearing Company numbers 300-319 (20) units and 365-389 (25 units), purchased from the St. Louis Car Co. in 1946 and 1947 respectively, are equipped with Westinghouse motors and controls, having Westinghouse parallel accelleration control with type 1432-J motors.

Cars purchased in 1946 idffer from the standard P.C.C. cars in that they are equipped for one or two man operation. The cross seat in front of the center door is removed and a jump seat installed for the conductor with a stanchion and shield between the conductor and the aisle for supporting the fare box and conductors equipment. Details and descriptive data of these cars are shown in sheet No. 10 which is attached. (NOT INCLUDED)

Cars bearing Company numbers 390-414 (25 unite) and 420-439 (20 units), purchased from the St. Louis Car Co. in 1949, are equipped, the former

AVERY® PV119ED

(390-414), with Westinghouse motors and controls and the later (420-439) with General Electric motors and controls.

These cars are equipped for one man operation. Details and descriptive data of these cars are shown in sheet No. 12 and sheet No. 13 which are attached.
(But NOT included)

GENERAL DESCRIPTION

The construction of the P.C.C. car bodies are standard light weight for city service, built by the St. Louis Car Company using P.C.C. Car Specifications, except the cars are 9' wide. The cars are equipped with 4 - 55 H.P., 300 volt D.C. motors, 2 of which operate in series on the 600 volt D.C. trolley circuit.

All of the cars are equipped with front and center doors, on the right side of the car. The front doors are controlled by 2 door motors so that one or both doors might be opened and the center doors are controlled by a one door motor.

The cars are equipped with Clark Equipment Company trucks which are equipped with General Electric Company brake actuators for electric operation of the drum on the armature shaft of each traction motor. The door operating mechanism is National Pneumatic Company equipment having the electric door motors. The center doors are equipped with sensitive edges which are connected through an interlock to the power control circuit

The seats are built with springs upholstering cushions having padded backs covered with dark green Koroseal Coating Seating Fabric, and are mounted on tubular frame with grab rail across the top of backs. The tubular frame and grab rail are made of stainless steel. The seating arrangement will accommodate 53 passengers on the one and two man cars and 55 passengers on the one man cars

The cars are equipped with destination signs in the front hood having a capacity of 32 exposures with 4-1/2" type. Side destination signs are installed in line with standee windows and forward of the center doors. This sign also has a capacity of 32 exposures with 4" type.

The cars are equipped with gongs, horns, instruments and control board which is in accordance with Standard PCC Cars Specifications. The main light circuit consists of 2 circuits one has 17 and one 18 lamps at 1.6 amp capacity in series. Two lamps on each circuit are located in the front destination sign box each lighting circuit is equipped with resistors to make up the equivalent of 20 lamps in each circuit. The auxilary light circuit is connected from the battery and connected to the head lights, 2 marker lights, 2 stop lights and step lights in the front vestibule.

The heating and ventilation system is of standard PCC Car design having a motor generator set direct connected to two blowers for a capacity of 2,000 C.F.M. for cooling the resistor and 1,000 C.F.M. for the traction motors. Ducts and dampers are installed as required for supplying heated air to the car from the accellerator compartment and necessary operated dampers thermostatically controlled for recirculating or dumping air as may be required during the heating season. This equipment was furnished by Consolidated Car Heating Company. Resistance type heaters having a capacity of 15 K.W. are installed in the main ducts to supply heat for the car during winter operation. A resistance heater having a capacity of 1,500 watts is installed on the defroster for keeping the windshield clear during the winter operation, one 1000 watt heater is installed on dash near operator.

MOTOR & CONTROL EQUIPMENT.

The cars are equipped with 4 - 300 volt motors, 55 H.P. 2 of which are connected in series for 600 volt operation. Twenty of the cars are equipped with General Electric Company motors and control equipment and seventy-one with

Westinghouse motors and control equipment. All of the cars, except 299 which was a test car purchased in 1945, are equipped with the General Electric Company brake actuators for operating the drum brake on the armature shafts of the traction motors. The brake equipment on the cars consist of the combination of motor generative brake, magnetic track brake and electrical applied drum brakes. The normal sequence of the brake operation is standard PCC Car design. The controls for operating the car are connected from the accelerator and brake pedal to the master accelerator and brake control by connecting rods. A four circuit interlock switch is connected to the third pedal which is known as the dead man pedal which when released or depressed to the floor will cut off power and apply the brakes. The cars are equipped with back up control equipment for operating the car from the rear. A section of the rear seat back is removed for access to the back up control equipment.

The cars are equipped with a resistance and circuit for operating electric track switch which allows the operator to control the current flow as required for proper operation of the electric track switch.

The cars are equipped with a 16 cell 32 volt lead acid type P-7-16 battery having a capacity of 56 amp. hrs. at 8 hr. rates. The battery is assembled in a 4 cell tray which may be drawn out for inspection and repairs bo the battery. The battery compartment is located under the rear cross seat and is accessible from the outside by opening two small doors.

DETAILED DESCRIPTION.

Weight of car equipped (without load)		37,990 lbs.
Seating capacity	1-man, 2-man	53
	1-man	55
Length over bumpers		46' 5-5.16"

Overall width		9' 0"
Width of aisles	front rear	47" 31"
width of seat		34"
Single or double end operation		Single end
Truck centers		22' 9"
Wheel base		6' 0"
Track gauge		4' 8-1/2"
Type of Truck		Clark Eqpt. Co. B-2 PCC Trucks
Wheel diameter		25"
Gear ratio & type of gearing		7.17 ~~8.16~~ TO 1 hypoid
Brakes, a combination of extended motor generative brake, magnetic track brake and electrically applied motor armature shaft drum brake,		foot operated.
Accelerator		foot operated.
Deadman's pedal controls interlock switch		foot operated

Reverser operating lever located to the right of the operator.

Motor cutout switches

Back-up controller

Motors - four (4) 300 volt motor connected two-in-series for operations on 600 volts.

Auxiliary heat 15 K.W. Operators heater 1,000 Watts, Defrosting heater 1,500 watts.

Doors - front and center, electric operated

The above detailed description will apply to all of the cars except car No. 299.

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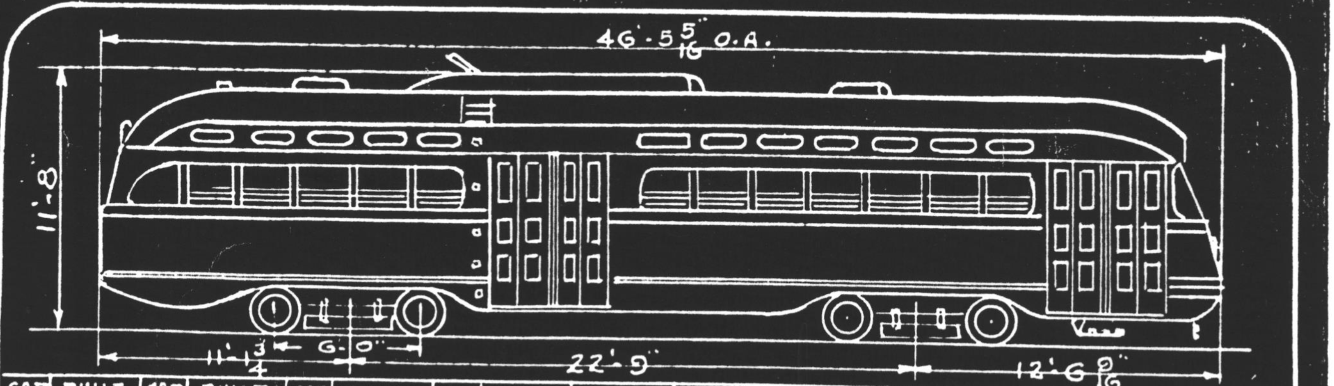


CAR	BUILT	CAR	BUILT	CAR	BUILT	CAR	BUILT	MAKE	St. Louis	BRAKES	DYN. ELEC. MAG	PCC CAR
320	DEC. 46	332	DEC. 46	344	Aug 47	356	Sep. 47	WEIGHT	37990	Journals	ROLLER	ALL STEEL
321	"	333	"	345	"	357	"	COST	[redacted]	TRUCKS	CLARK	U.S. 13 TROLLEY BASE
322	"	334	"	346	"	358	"	WIDTH	9'-0"			O.B. RETRIEVER
323	"	335	"	347	"	359	"	SEATS	CROSS	WHEELS	25" RESIL.	HUNTER SIGNS
324	"	336	"	348	"	360	"	EXITS	F & C			HOUDAILLE SHOCK ABS
325	"	337	"	349	"	361	"	DOORS	ELEC.	GEAR	43T. HYP. BEV	TRACK BRAKE ES109
326	"	338	"	350	"	362	"	PLATFORM	FLUSH	PINION	GT. " "	
327	"	339	"	351	"	363	"	HEAT	ELEC.			SEATS 52
328	"	340	July 47	352	"	364	"	MOTORS FORCED VENTILATED				FRONT AISLE 47"
329	"	341	"	353	"			4 GE 300V 55 H.P. GE1220E1				REAR AISLE 31"
330	"	342	"	354	"			CONTROLLER G.E. 17KM12N				
331	"	343	"	355	"			MOTOR GENERATOR GMG 129				G.E. CARS
45 CARS								LINE SWITCH				SHEET No 11

SPECIFICATIONS

SERVICE CARS

WIRE CAR NO. 3

12-31-1915

GENERAL DIMENSIONS		
Length over Bumpers	38' 0"	
Length over Cab	10' 0"	
Width over all	8' 9"	
Height, floor to ceiling	7' 0"	
Height, rail to trolley board	10' 11¼"	
Truck Centers	22' 0"	
FRAMING		
Side Sills	5" x 8" Oak reinforced with 8" channels	
End Sills	5" x 7" Oak reinforced with 2 pieces 1" x 5" steel	
BUMPER	Oak and steel.	
ROOF Type and Material	Flat; Canvas over Yellow Pine	
CAB		
Size	7' 10" x 10' 0' x 7' 0" high	
Material	Yellow Pine	
WINDOWS		
Cab - Side Sash	2 Drop 27" x 33"	
End Sash	5 Drop 27" x 33"	
Storm Sash	7 27" x 33"	
DOORS	1¼" x 29" x 6' 9" 2 panel ash, 1 glass 20" x 27½"	
FLOOR	2" Oak	
SIGNALS		
Gongs	1 12" diameter	
LIGHTS	6 36 watt Mazda	
SPECIAL EQUIPMENT		
Lineman's Tower, revolving, raised by air	1	
Heavy timber Reel Stand	1	
National AA-2 Air Compressor	1	ALLIS-CHALMERS AA-6 ON OTHER CARS
Air Motor, Ingersoll-Rand Co. Imperial Hoist #3778	1	

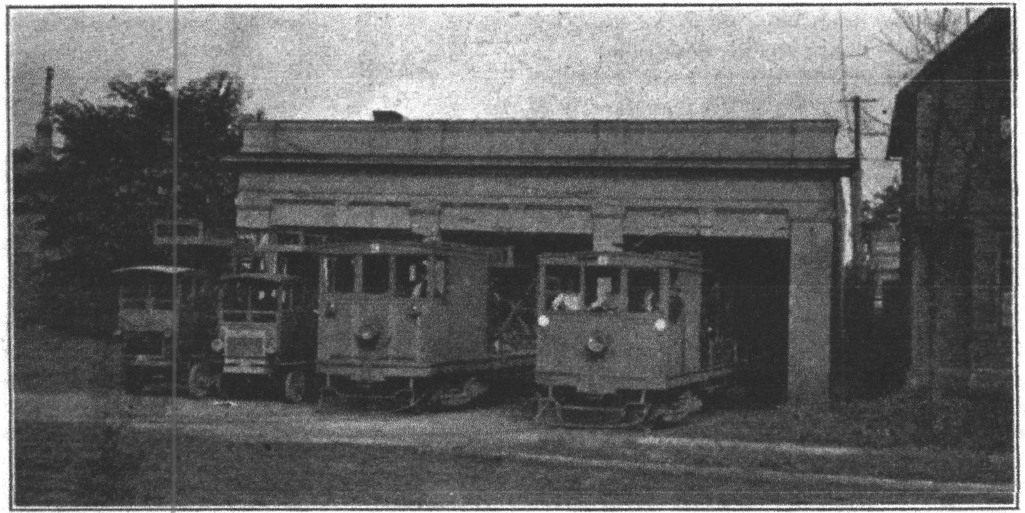
WIRE CAR NO. 5

12-31-1915

GENERAL DIMENSIONS	
Length over Bumpers	38' 0"
Length over Cab	10' 0"
Width over all	8' 4"
Height, floor to ceiling	6' 7"
Height, rail to trolley board	10' 6"
Truck Centers	22' 0"
FRAMING	
Side Sills	5" x 8" Oak reinforced with 8" channels
End Sills	5" x 7" Oak reinforced with 2 1" x 5" steel bars
BUMPER	Oak and steel.
ROOF Type and Material	Flat; Canvas over Yellow Pine
CAB	
Size	7' 9" x 10' 0" x 6' 7" high
Material	Yellow Pine
WINDOWS	
Cab - Side Sash	2 Drop 27½" x 35"
End Sash	4 Drop 27½" x 35" 1 Drop 23¼" x 35" (new)
Storm Sash	6 27½" x 35"; 1 23¼" x 35"
DOORS	1-1¼" x 31" x 6' 3" 1 panel, 1 glass 23½" x 32"
FLOOR	2" Oak
SIGNALS	
Gongs	1 12" diameter
LIGHTS	5 36 watt Mazda
SPECIAL EQUIPMENT	
Lineman's Tower, revolving, hand operated	1
Heavy timber Reel Stand	1

Tower Trucks and Cars at Minneapolis

The Twin City Company Has Built Four Auto Towers and Four Tower Cars, Which Handle All of the Emergency Work in Minneapolis and St. Paul



THIS EQUIPMENT TAKES CARE OF THE OVERHEAD ON THE MINNEAPOLIS DIVISION

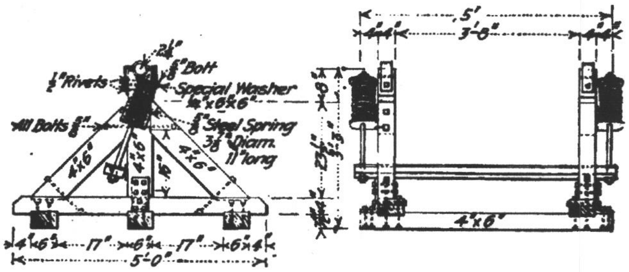
IN THE MAINTENANCE and construction of more than 450 miles of overhead system the Twin City Rapid Transit Company, Minneapolis, uses four automobile tower trucks and four tower cars, half of them in Minneapolis and half in St. Paul. Although the tower equipment used on various railway systems is similar, this equipment is of particular interest in some details because it is standard throughout and because it was all built by the company.

The four automobile tower trucks are each equipped with a 2-ton commercial chassis. Trucks 1, 2 and 3 are each equipped with 35-hp. engines while truck 4 has a 45-hp. engine and weighs about 2000 lb. more than the three other trucks. The towers are built of wood, fir being used in most parts, steel being used only as bracing in the platform and for the sliding surface of the removable section. The vertical members are 3-in. x 3-in., cross-braced by ¾-in. x 3-in. members in the lower section and by 1⅛-in. x 3-in. members in the upper section. The framework is bolted together with ⅜-in. carriage bolts. The truck body has an over-all length of 16 ft. 10 in. About 7ft. at the rear end of this is taken up by the tower. The over-all width of the truck is 6 ft. The tower when lowered stands 12 ft. 1¾ in. high from the ground and can be raised to a height of 12 ft. 7¾ in. The height lowered is limited by the low overhead clearance of some viaducts under which the trucks must pass. The tower platform measures 10 ft. x 3 ft. 7½ in. with an overhang of 5 ft. 11½ in.

MAIN FEATURES OF TOWERS

One of the main features of the towers is that they are designed for complete rotation at the base. The reason for this is the desire for greater stability than usually results with rotation of the platform only. The radius of rotation is 2 ft. 10 in. and the stationary surface is a 3-in. x 3-in. x ⅜-in. angle ring, the bearing surface of the tower corners being steel plates. The tower is revolved by hand and is held in position by cam levers. It is also raised and lowered by hand, an eight-tooth sprocket on the crank operating a forty-tooth sprocket on the drum axis by means of a No. 55 Jeffrey detachable chain. This operation is easily accomplished by one man. Details of the tower equipment are shown in the accompanying illustrations.

A supply of tools and small equipment is carried in boxes at the back of the truck while ropes, tackle, larger equipment, 500 ft. of span wire and 200 ft. of trolley wire are hung conveniently on hooks on the sides of the tower. Signals are transmitted to the driver by a gong located on the tower. The cab is entirely inclosed for cold or inclement weather, although windows on all sides can be lowered when desirable. The trucks are equipped with 4-in. single tires in front and 4-in. dual tires in the rear. These tires give an average of 10,000 miles. The trucks weigh stripped from 6500 to 7100 lb. and the crew comprises three men.



RACK WITH BRAKE FOR TROLLEY WIRE REEL ON TOWER CAR

CAR TOWERS SIMILAR TO THOSE ON TRUCKS

The towers for the cars are very similar in construction to those used on the trucks. The vertical members are the same but the cross-bracing is ⅞ in. x 3 in. in

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the lower section and the same in the upper section. While the auto tower measures about 4 ft. square the tower on the cars is about 4 ft. wide by 6 ft. long. This tower also is not quite as high, either lowered or raised, as is the auto tower and has a little greater overhang. The rotation feature on these towers is the same as that already described, the radius of rotation in this case, however, being 3 ft. 9 in. The arrangement for lowering and raising these towers is similar, with the exception that one tower is equipped with a three-cylinder air motor for air operation.

The capacity for tools on the cars is more extensive than on the trucks. On one side of the cab is a work bench with vise, etc., and on the other a series of pockets or bins containing all kinds of small supplies. The cars are also equipped with a reel of approximately 1 mile of trolley wire mounted on a rack or wench equipped with a brake.

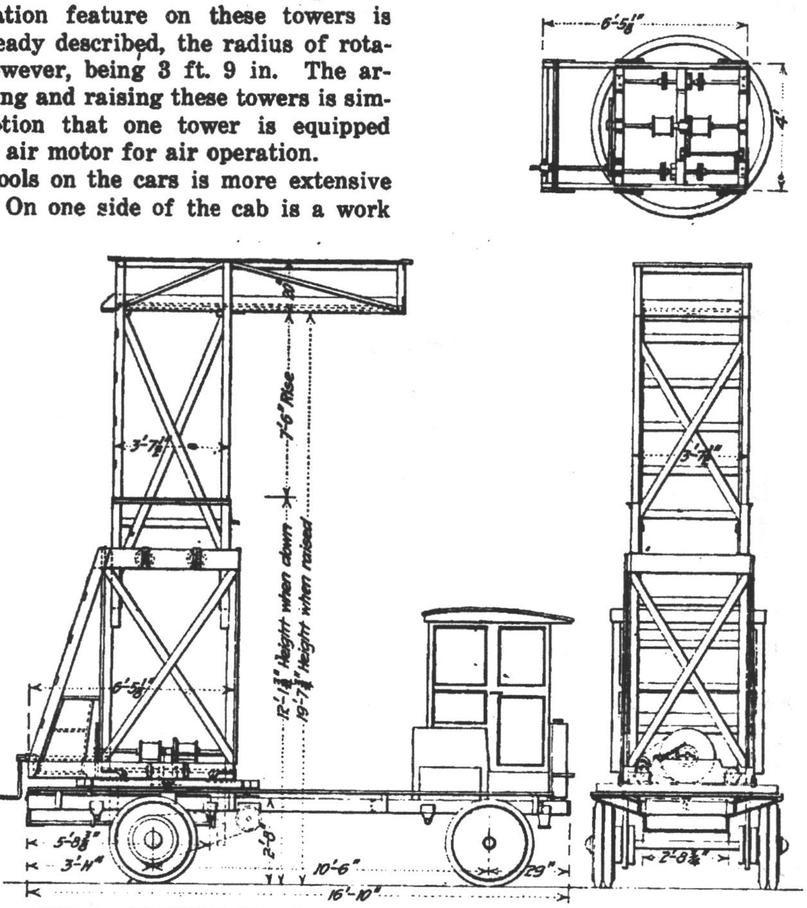


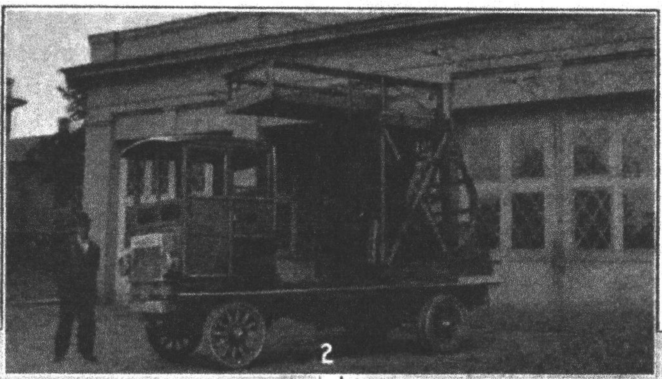
FIG. 1. DETAILS OF AUTOMOBILE TOWER TRUCK CONSTRUCTION

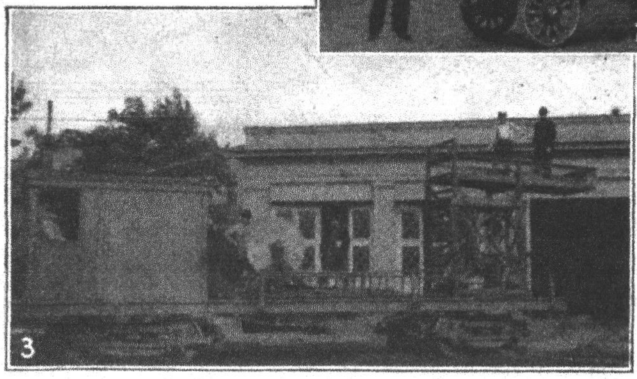
The tower cars were built entirely by the company. The trucks are standard Twin City equipped with 4 GE-57 motors geared for a speed of 45 m.p.h. By means of a series-multiple switch the four motors can be operated on a series in the city and when stringing trolley wire giving a speed of about 4 m.p.h. on the first notch of series. The control is General Electric K-14. The floor framing is 4-in. x 6-in. yellow pine reinforced by 6-in. pine channels for the side sills. The flooring is 2-in. pine. The length over the bumper is 40 ft., the width 7 ft. 8 in., the cab is 10 ft. long and the height from top of rail to top of cab is 11 ft. 4 in.

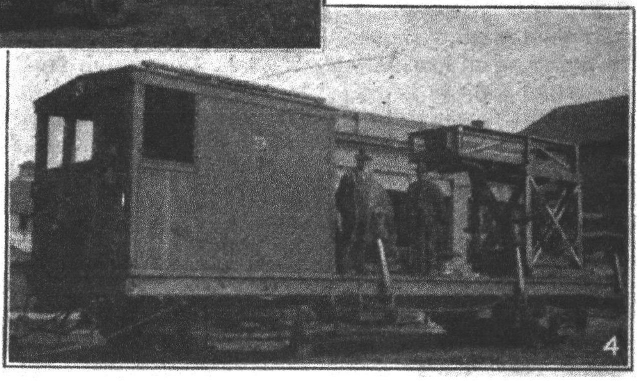
On construction work the trolley wire is strung alive and furnishes energy to the motors of the car by a unique device as shown. The end of the reel is attached to the live overhead at the starting point. By means of a hook over the trolley wheel an auxiliary wheel is suspended and the new wire being strung passes through this wheel and over a roller on the front of the lower platform. Thus the energy for operation is furnished through the new wire being taken from the reel. Four men with this equipment can take down and reel up 1 mile of old trolley wire and string the same amount of new wire in four hours.

The auto-towers are used on emergency repair work and for small maintenance and construction, as they can be located beside the track with no interruption to traffic. The cars, however, are generally used on any work of over two spans in length and where traffic is light.

This equipment has proved of great assistance in carrying on the maintenance work of the system and its operating cost has been very low, as is shown by the following:







TYPES OF AUTO TOWERS AND TOWER CARS

Fig. 2, the Twin City auto tower truck and its equipment; Fig. 3, stringing live trolley wire from which the car is operated; Fig. 4, the Twin City tower car and its equipment

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WORK CAR NO. 9

12-31-1915

GENERAL DIMENSIONS	
Length over Bumpers	36' 0"
Length over Body	27' 6"
Length over Cab	6' 0"
Width over all	8' 8"
Height, floor to ceiling	6' 6"
Height, rail to trolley board	10' 9¼"
Truck Centers	22' 0"
FRAMING	
Side Sills	7" 91# T Rail
End Sills	5" x 5" Oak reinforced with 2 1" x 5" steel bars
BUMPER	7" x 9" Oak reinforced with ¼" x 7" steel bars
SHEATHING	
Sides	2" x 23" Oak, 5 hinged sections on each side
Ends	2" x 23" Oak, removable
ROOF Type and Material	Flat; Canvas over Pine
CAB	
Size	4' 1" x 6' 0" x 6' 6" high
Material	Yellow Pine
WINDOWS	Front 4 Side + 1 Rear
Cab - Side and End Sash	2 Drop 31½" x 33"; 5 Drop 20" x 33"
DOORS	1 D & M 7/8" Yellow Pine hinged, 23" x 5' 10"
FLOOR	2" Oak
SIGNALS	
Gongs	1 12" diameter
LIGHTS	4 36 watt Mazda

Note: D & M means Dressed & Matched.

Capacities:

7-10	14.6 C.Y.
11-12	16.25 C.Y.

WORK CAR NO. 13

12-31-1915

GENERAL DIMENSIONS	
Length over Bumpers	37' 6"
Length over Body	29' 10"
Length over Cab	4' 0"
Width over all	8' 8"
Height, floor to ceiling	6' 5"
Height, rail to trolley board	10' 9¼"
Truck Centers	22' 0"
FRAMING	
Side Sills	7" 91# T Rail
End Sills	5" x 6" Oak reinforced with 1 7/8" x 5" steel plate
BUMPER	Oak and steel
SHEATHING	
Sides	1½" x 23" Oak, 6 hinged sections on each side
Ends	1½" x 23" Oak, removable
ROOF Type and Material	Flat; Canvas over Pine
CAB	
Size	4' 0" x 6' 0" x 6' 5" high
Material	Yellow Pine
WINDOWS	
Cab - Side and End Sash	2 Drop 32 3/4"" x 34"; 5 Drop 20 3/4" x 34"
DOORS	1 7/8" x 24" x 5' 9" sliding D & M Yellow Pine and cleats
FLOOR	2" Oak
SIGNALS	
Gongs	1 12" diameter
LIGHTS	5 36 watt Mazda

Capacity 13-16 16.35 C.Y.

WORK CAR NO. A14

12-31-1915

GENERAL DIMENSIONS	
Length over Bumpers	25' 6"
Length over Body	17' 0"
Length over Cab	6' 6"
Width over all	8' 0"
Height, floor to ceiling	6' 6"
Height, rail to trolley board	10' 9½"
Truck Centers	15' 2"
FRAMING	
Side Sills	1 piece 5" x 8"; 1 piece 4" x 8" Yellow Pine reinforced with 1 8" I Beam
End Sills	6" x 9" Pine
BUMPER	Oak and steel
SHEATHING	
Sides	3" x 24" Pine with 4 3" x 4" Oak Standards each side
Ends	3" x 24" Pine
ROOF Type and Material	Flat; Canvas over Pine
CAB	
Size	6' 6" x 7' 4" x 6' 6" high
Material	Pine
WINDOWS	1 Front Center + 2 side & 1 Rear Front (side) (Rear)
Cab	4 Drop 30½" x 35½"; 2 Drop 23½" x 35½"; 1 Fixed 18" x 30"
DOORS	1 7/8" x 28" x 6' 0" sliding D & M Pine with cleats
FLOOR	2" Pine
SIGNALS	
Gongs	1 12" diameter
LIGHTS	4 36 watt Mazda
CURTAINS	Canvas, 1 20" x 30", 1 26" x 36"

WORK CAR NO. 19

12-31-1915

GENERAL DIMENSIONS	
Length over Bumpers	37' 6"
Length over Body	25' 9"
Length over Cab	6' 1"
Width over all	8' 8"
Height, floor to ceiling	7' 0"
Height, rail to trolley board	10' 9¼"
Truck Centers	22' 0"
FRAMING	
Side Sills	7" 91# T Rail
End Sills	5" x 5" Oak reinforced with 1 7/8" x 5" steel bar
BUMPER	Oak and steel
SHEATHING	
Sides	1½" x 23" Oak, 6 hinged sections each side
Ends	1½" x 23" Removable
ROOF Type and Material	Flat; Canvas over Pine
CAB	
Size	7' 9" x 6' 1" x 7' 0" high Regular + Extension
Material	D & M Pine
WINDOWS	Front 4 Side + 1 Rear Ext. Cab
Cab	2 Drop 33" x 34"; 5 Drop 21" x 34"; 2 Fixed 18" x 26 3/4"
DOORS	1 7/8" x 24" x 6' 0" D & M Pine Reg. Cab
	1 7/8" x 24" x 6' 4" D & M Pine, 4 panel Ext Cab
FLOOR	2" Oak
SIGNALS	
Gongs	1 12" diameter
LIGHTS	4 36 watt Mazda

Capacity 17-19 15.75 C.Y.

LOCOMOTIVE NO. 20

12-31-1915

GENERAL DIMENSIONS	
Length over Bumpers	31' 0"
Length over Body	25' 0"
Width over all	9' 0"
Height, rail to trolley board	11' 3"
Truck Centers	15' 0"
FRAMING	
Side Sills	1 9" I Beam
End Sills	
SHEATHING	
Sides and Ends	D & M Yellow Pine
ROOF Type and Material	Flat; Canvas over D & M Yellow Pine
CAB	
Size	7' 0" x 7' 5" x 6' 6" high
WINDOWS	
Cab - Side sash	4 Drop 24" x 27"
End sash	6 Drop 26¼" x 27"
DOORS	
Side	2 Sliding 1¼" x 24" x 6' 0", 4 panel, Ash, 1 Glass 17" x 23"
End	2 1¼" x 25" x 28" cupboard Inside Cab - access to Hoods
FLOOR	Oak
SIGNALS	
Gongs	1 12" diameter
LIGHTS	5 36 watt Mazda
SPECIAL EQUIPMENT	
MCB Couplers	2

WRECKING CAR NO. 21

12-31-1915

GENERAL DIMENSIONS	
Length over Bumpers	42' 0" (including couplers)
Length over Body	38' 5"
Length over Cab	4' 0"
Width over all	9' 0"
Height, floor to ceiling	6' 6"
Height, rail to trolley board	11' 7"
Truck Centers	26' 0"
FRAMING	
Side Sills	12" I Beams
End Sills	12" I Beams
BUMPER	Oak and steel
ROOF Type and Material	Flat; Canvas over Pine
CAB	
Size	4' 0" x 6' 0" x 6' 6" high
Material	D & M Pine
WINDOWS	Front 4 Side + 1 Rear
Cab	2 Drop 33" x 34"; 5 Drop 21" x 34"
DOORS	1 7/8" x 24" x 5' 9" sliding, D&M Pine with cleats
FLOOR	2" Oak
SIGNALS	
Gongs	1 12" diameter
LIGHTS	4 36 watt Mazda

SPECIAL EQUIPMENT

14 cast sockets for side standards. MCB & TCRT couplers on both ends.

Wrecking Crane: Bay City Industrial Works, Bay City, Mich. No. 1869, capacity 30,000 lbs.,

G. E. Motor #200881 and 200909, 13.6 amps, 500 volts, 7.5 h.p., 1000 r.p.m.	2
G. E. R-28 Controller	2

SNOW PLOW NO. 22

12-31-1915

GENERAL DIMENSIONS	
Length over Bumpers	38' 0"
Length over Body	27' 0"
Width over all	8' 6"
Height, floor to ceiling	6' 5"
Height, rail to trolley board	10' 7¼"
Truck Centers	15' 0"
FRAMING	
Side Sills	10" Channel
End Sills	5" x 8" Oak, reinforced with 2 1" x 5" steel plates
SHEATHING	
Sides and Ends	D & M Pine
BUMPERS	Oak and steel
ROOF Type and Material	Flat; Canvas over Pine
WINDOWS	
Side and End sash	12 Drop 26 3/4" x 35" 3 Each End + 4 GS + 2 PS
DOORS	
Side	1 1 3/4" x 35" x 6' 2", 2 panel, hinged
FLOOR	2" Oak
SIGNALS	
Gongs	1 12" diameter
Conductor bells	1 4 1/8" diameter
LIGHTS	8 36 watt Mazda
SPECIAL EQUIPMENT	
Plow - Size	4' 8" x 12' 6"
Wing - Size	3' 0" x 12' 3"
Hand chain hoist mechanism for raising plow	2
Sand Boxes	1 3' 0" x 3' 0" x 3' 0", 1½" Yellow Pine
	1 2' 2" x 2' 6" x 4' 0", 1¼" Yellow Pine
	1 22" x 3' 2" x 3' 6", 1½" Yellow Pine
Air cylinder and controller	1

SNOW PLOW-SWEEPER NO. 23

12-31-1915

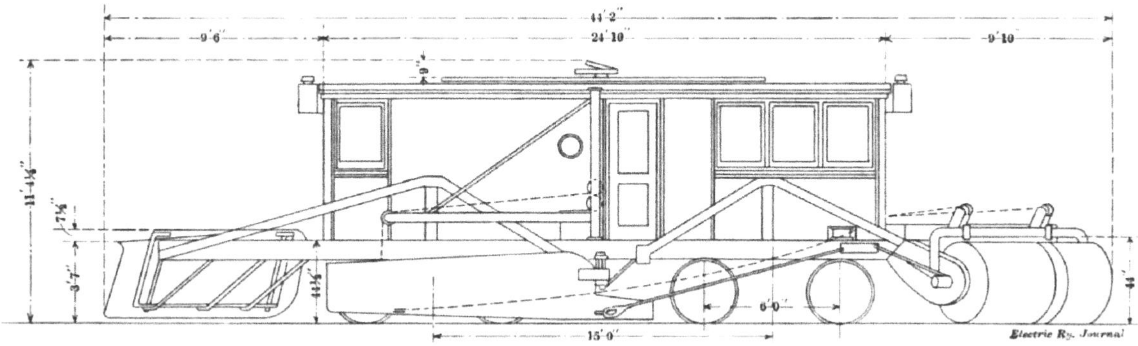
GENERAL DIMENSIONS	
Length over Bumpers	44' 6"
Length over Body	25' 0"
Width over all	8' 6"
Height, floor to ceiling	6' 5"
Height, rail to trolley board	10' 7¼"
Truck Centers	14' 8"
FRAMING	
Side Sills	10" Channel
End Sills	5" x 8" Oak, reinforced with 1 3/8" x 5" steel bar
SHEATHING	
Sides and Ends	D & M Pine
BUMPERS	Oak and steel
ROOF Type and Material	Flat; Canvas over D&M Pine
WINDOWS	
Side and End sash	14 Drop 26 3/4" x 35" 3 Each End + 4 Each Side
Storm sash	3 26 3/4" x 35"
DOORS	
Side	2 1½" x 26" x 6' 1", 2 panel, hinged 1 Opening boarded up PS for Sand ?
FLOOR	1½" Oak
SIGNALS	
Gongs	2 12" diameter
LIGHTS	6 36 watt Mazda
SPECIAL EQUIPMENT	
Plow - Size	4' 6" x 12' 6"
Wings - Size	1 34" x 12' 3", 7/16" steel; 1 34" x 14' 0"
Broom - Size	3' 0" diameter, 7' 8" long
Hand hoist mechanism for raising plow and broom	4
Sand Boxes	1 3' 0" x 3' 0" x 3' 0", 1½" material 1 16" x 16" x 24", 7/8" material
Air cylinder and Controller	2
Broom Motor	1 G.E.70
Broom Motor Controller R-17	1

SNOW PLOW-SWEEPER NO. 29

12-31-1915

GENERAL DIMENSIONS		
Length over Bumpers	45' 4"	
Length over Body	25' 0"	
Width over all	8' 9"	
Height, floor to ceiling	6' 5"	
Height, rail to trolley board	10' 7¼"	
Truck Centers	15' 0"	
FRAMING		
Side Sills	10" Channels	
End Sills	5" x 7" Oak, reinforced with 2 1" x 5" steel plates	
SHEATHING		
Sides and Ends	D & M Pine	
BUMPERS	Oak and steel	
ROOF Type and Material	Flat; Canvas over D&M Pine	
WINDOWS		
Side and End sash	14 Drop 26½" x 35"	3 Each End + 4 Each Side
Storm sash	6 26½" x 35"	
DOORS		
Side	2 1 3/4" x 26" x 6' 2", 2 panel, hinged	Each Side
FLOOR	2" Oak	
SIGNALS		
Gongs	2 12" diameter	
Conductor Bells	2 4 1/8" diameter	
LIGHTS	6 36 watt Mazda	
SPECIAL EQUIPMENT		
Lights for Wings	4 36 watt Mazda	
Light Frames for Wings	2	
Plow - Size	4' 8" x 13' 0"	
Wings - Size	1 2' 9" x 12' 3"; 1 3' 0" x 12' 3"	
Broom - Size	3' 0" diameter, 7' 8" long	
Hand chain hoist mechanism for raising plow, wings and broom	4	
Sand Boxes	1 3' 0" x 3' 0" x 3' 0", 1½" Pine	
	1 14" x 2' 6" x 3' 0", 1¼" Pine	
Sand Screen	1	
Air cylinder and Controller	2	
Broom Motor G.E. 67	1	later replaced by 1 G.E.70
Broom Motor Controller K-11	1	" " " 1 K-28

half fills the cast-iron pressure tank just described. When all bubbling has ceased the cover is securely bolted to the tank and 50 lb. air pressure is applied above the liquid for about 60 minutes; then the cover is removed and the coil is raised and temporarily held on strap-iron saddles while the excess liquid drips back into the tank.



Side Elevation of Minneapolis Snow Plow

Field coils that have become loose in service on the company's 160-hp motors are brought into the shop, the rivets are tightened, the coils are heated and then submerged in the compound under pressure. After drying they are put back into service and satisfactory insulation by this method has been shown.

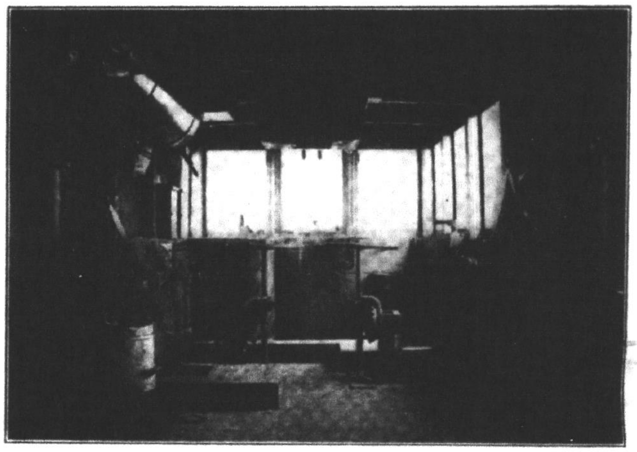
◆

NEW SNOW PLOW FOR MINNEAPOLIS

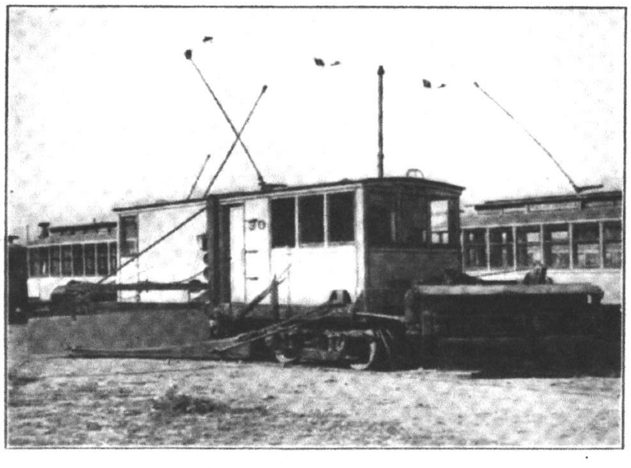
A new type of snow plow has recently been developed at the shops of the Twin City Rapid Transit Company, of Minneapolis. One of these plows was built for service last year, and proved so successful in combating the drifts, which are heavy and frequent in Minnesota, that four others of the same pattern were built last summer.

The new plow is a combination shear plow and sweeper, with the shear at one end and a rotary sweeper at the other. It is equipped to operate in either direction and from both ends, although as a rule the plow end will be the forward end of the plow. In this case the shear and wings will clear the tracks of the greater part of the snow and the amount between the rails left by them will be removed by the sweeper in the rear. When the side wings are extended the plow will remove the snow from a strip 19 ft. wide, including the strip between the tracks, and will throw the snow out 12 ft. from the outside rail. If heavy, frozen drifts which cannot be moved by the front wing are encountered, the plow is operated from the other end and the steel broom soon cuts through the snowdrifts.

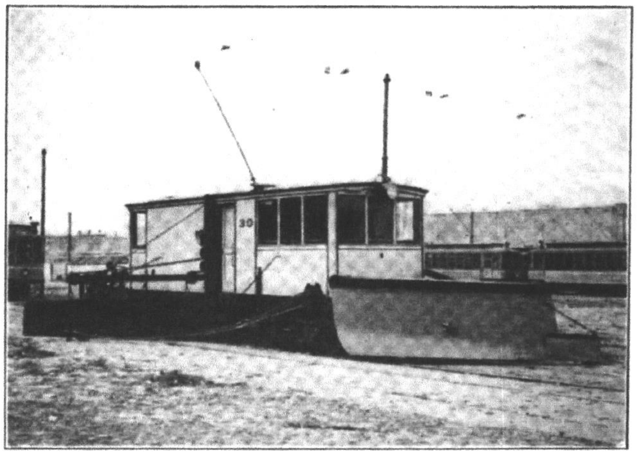
The shear in front, which is supported directly on the extended side sills of the car body and is also braced from above, is fitted at its outer and lower end with a square steel plate which can be set to any desired height, and the height of the shear itself can be regulated by means of a reel and drum from the cab. The bottom of the shear is shod with steel blocks rounded so that they will slide on the rails, and is so constructed that when it strikes obstructions, such as paving blocks, it will rise and ride over them without difficulty. The side wings are also arranged so that they can be dropped from the cab, and when thus set are held rigidly in place by a kind of toggle joint. Both of the wings may be raised and lowered by means of jib cranes and air power.



Interior of Cab of Snow Plow



View of Sweeper End



View of Shear Plow End

The steel broom at the rear end of the car is 52 in. in diameter and is revolved by a chain from a special motor carried in the cab. This broom is also raised and lowered by air power.

All electrical cables composing the car wiring are carried in boxed-in troughs on the floor of the cab, so that they are easily accessible in cases of emergency. The resistances are carried on the roof. The car is mounted on Baldwin No. 4 trucks and is equipped with four GE-73 motors with C-6 type M control for operating, a GE-67 motor for revolving the broom, compressors, etc. The weight of the plow complete is 66,500 lb., and it is 44 ft. 2 in. over all.

ERJ November 1930 Snow Removal #75-82

The Twin City Rapid Transit Company has built nineteen snow plows [18 TCRT 1 DSR] in its own shop. They weigh approximately 80,000 lb. each. Trucks are equipped with four GE-73 motors geared for low speeds. The nose of the plow is hinged to a heavy frame in such a way that it can rise when it strikes rough track or hard paving blocks. Immediately back of the nose is a combined scraper and steel broom. Both the nose and the scraper broom are air-controlled, as is also a small extension to the plow nose. On the side of the plow is a large wing which throws the snow about 12 ft. beyond the outside rail. This wing is pulled in and out by means of an electrically operated windlass, and is raised or lowered by means of an air cylinder. Between the front and rear trucks is another air-operated combined steel broom and scraper consisting of 5,200 steel cutting points which are very effective in removing ice.

U.G. DEPT. WORK CAR NO. 33

12-31-1915

GENERAL DIMENSIONS	
Length over Bumpers	37' 6"
Length over Body	21' 6"
Length over Cab	10' 0"
Width over all	9' 0"
Height, floor to ceiling	6' 6"
Height, rail to trolley board	10' 11¼"
Truck Centers	22' 0"
FRAMING	
Side Sills	9" I Beams
End Sills	9" I Beams
BUMPER	7" x 9" Oak; ¼" x 7" steel plate
SHEATHING	
Sides	2" Oak, 4 hinged sections on each side
Ends	2" Oak, Removable
ROOF Type and Material	Flat; Canvas over D & M Yellow Pine
CAB	
Size	8' 1" x 10' 0" x 6' 6" high
WINDOWS	
Cab - Side Sash	2 Drop 26½" x 36"
End Sash	1 Drop 26½" x 36"; 1 Drop 28 3/4" x 35 3/4"; 3 Drop 28¼" x 36"
DOORS	1 1 1/8" x 31" x 6' 3" sliding, 3 panel Ash, 1 glass 22½" x29"
FLOOR	2" Oak
SIGNALS	
Gongs	1 12" diameter
LIGHTS	5 36 watt Mazda

capacity 20,000 lbs.

SAND BLAST CAR NO. 35

12-31-1915

GENERAL DIMENSIONS	
Length over Bumpers	24' 2"
Length over Body	22' 6"
Width over all	9' 0"
Height, floor to ceiling	6' 2½"
Height, rail to trolley board	10' 9"
Truck Centers	Single Truck
FRAMING	
Side Sills	7" Channel and ¼" x 6" plate
End Sills	7" Channel, ¼" x 7" plate, 2" x 6" wood
SHEATHING	
Sides and Ends	7/8" D & M Pine
BUMPERS	Oak and steel
ROOF Type and Material	Turtle Back; Canvas over Whitewood
WINDOWS	PS GS
Side sash	4 Drop 28 3/4" x 32 3/4"; 2 Drop 31¼" x 32 3/4"
End sash	6 Drop 32¼" x 32 3/4" 3 Each End
DOORS	1 1 5/8" x 5' 5½" x 5' 9½" sliding, 5 9¼" x 18" glass GS
FLOOR	Oak
SIGNALS	
Gongs	1 12" diameter
Conductor bells	1 4 1/8" diameter
LIGHTS	4 36 watt Mazda
SPECIAL EQUIPMENT	
Sand Box - Size	21" x 2' 6" x 6' 0"; 7/8" D&M Yellow Pine

Sand Blast Tank, American Diamond Blast Co., Air guage, etc.: 1 Cir. 12' 7" x 4' 11½" high, 5/16" sheet iron

Allis-Chalmers Christensen Air Compressor, Type D-4, 14 amp., 650 volts, 10 h.p., 1100 r.p.m., #3422C 1

Allis-Chalmers Air Compressor Governor, #30 to G, 11.21 amp. 1

Housing for Compressor: 7/8" Yellow Pine

SNOW PLOW NO. 36

12-31-1915

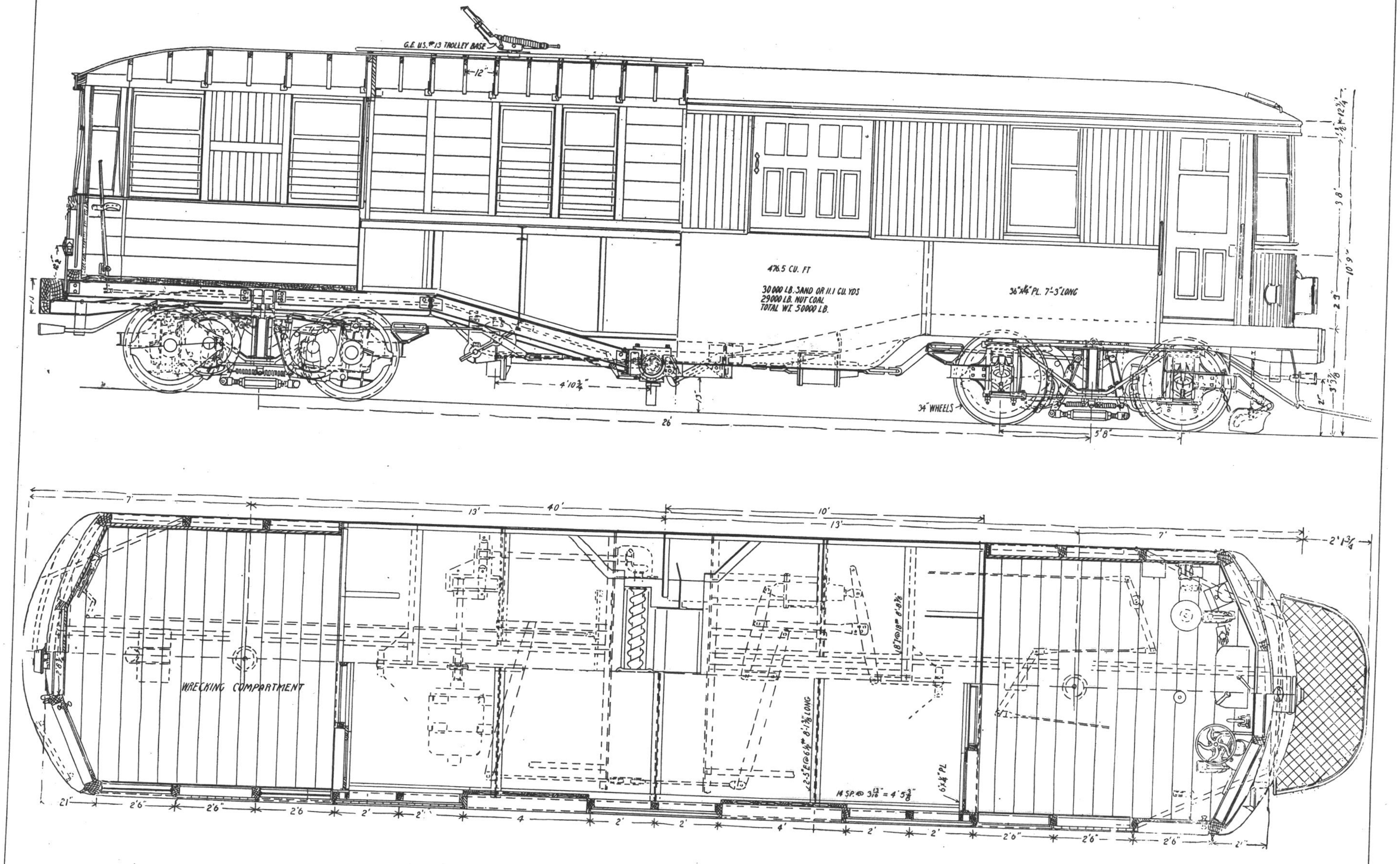
GENERAL DIMENSIONS		
Length over Bumpers	36' 6"	
Length over Body	27' 0"	
Width over all	9' 0"	
Height, floor to ceiling	6' 5"	
Height, rail to trolley board	10' 7¼"	
Truck Centers	15' 0"	
FRAMING		
Side Sills	10" Channels	
End Sills	5" x 8" Oak, reinforced with 2 1" x 5" steel plates	
SHEATHING		
Sides and Ends	7/8" Pine	
BUMPERS	Oak and steel	
ROOF Type and Material	Flat; Canvas over D&M Pine	
WINDOWS		
Side sash	5 Drop 26 3/4" x 34 3/4"; 1 Fixed 26 3/4" x 34 3/4"	4GS + 2PS
End sash	6 Drop 26 3/4" x 34 3/4"	3 Each End
Storm sash	6 26 3/4" x 34 3/4"	
DOORS	1 1 3/4" x 25¼" x 6' 3", 2 panel, Poplar, hinged	GS
FLOOR	2" Oak	
SIGNALS		
Gongs	1 12" diameter	
LIGHTS	10 36 watt Mazda	
SPECIAL EQUIPMENT		
Plow - Size	5' 0" x 12' 6" with 18" x 24" dummy extension	
Wings - Size	3' 0" x 12' 0"	
~~Broom - Size~~	~~3' 0" diameter, 7' 8" long~~	[ERROR]
Hand lift mechanism	1	
Air cylinder and Controller	1	
G.E. Motor #200998, 7 amp, 640 volts, 5 h.p., 1150 r.p.m.	1	} for the wing plow
Motor Controller R-28	1	

SAND CAR NO. 44

12-31-1915

GENERAL DIMENSIONS	
Length over Bumpers	40" 5"
Length over Body	20' 4"
Width over all	9' 1"
Height, floor to ceiling	7' 3¼"
Height, rail to trolley board	10' 11½"
Truck Centers	26' 0"
FRAMING	
Side and End Sills	Steel
BUMPERS	Oak and steel
VESTIBULES	Front 8' 7"; rear 8' 7"
SHEATHING Sides and Ends	Steel and Oak
ROOF Type and Material	Turtle Back; Canvas over Whitewood
WINDOWS	
Body - Side sash	4 Drop 39½" x 21¼"
Front Vestibule - Side sash	2 Fixed 26 3/4" x 29 3/4"; 1 Fixed 27¼" x 29 3/4"
End sash	3 Drop 25 3/4" x 33";3 Drop 15 3/4" x 33";2 Fixed 21¼" x 39¼"
Rear Vestibule - Side sash	4 Fixed 27¼" x 39 3/4"
End sash	2 Drop 25 3/4" x 33";2 Drop 15 3/4" x 33";2 Fixed 21¼" x 39¼"
WINDOW GUARDS	¼ Oval Iron 3/4"; 24 40", 6 48", 21 32"
DOORS	
Side of Body	2 1½" x 3' 8 3/4" x 4' 0" sliding, Oak, 4 small lights each
End of Body - Front	1 25½" x 46" sliding, Oak; 1 25½" x 46" fixed
Rear	1 25½" x 46" fixed; 1 25½" x 46" sliding
Front Vestibule	1 28¼" x 5' 9 3/4" hinged, 3 hinges
Rear Vestibule	1 33¼" x 5' 9¼" hinged, 3 hinges
FLOOR	Oak and Steel
SIGNALS	
Gongs	1 12" diameter
Conductor bells	2 4 1/8" diameter
LIGHTS	7 36 watt Mazda
SPECIAL EQUIPMENT	
Motor to drive worm feed (T-295-4) 7½ H.P.	1
G.E. R-28-A Controller for above motor	1
Worm Feed	1

Capacity
Storage 480 cu. ft.
Sand 30,000 lbs (17.7 C.Y.)
Water 27,750 lbs (3,550 gal.)
Nut Coal 29,120 lbs (14.5 Tons)

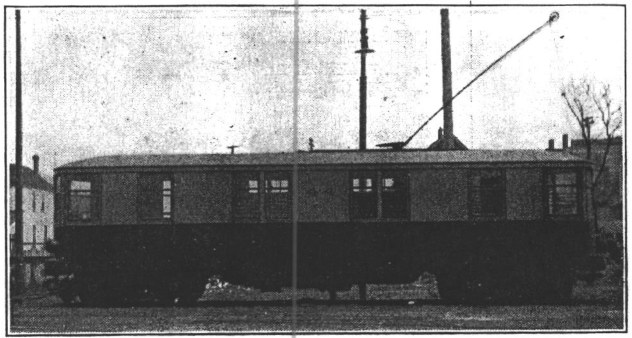

G.E. U.S. No 13 TROLLEY BASE
12"
476.5 CU. FT
30000 LB. SAND OR 11.1 CU. YDS
29000 LB. NUT COAL
TOTAL WT. 50000 LB.
36"x5/16" PL. 7'-3" LONG
34" WHEELS
4'10 3/4"
26'
5'8"
WRECKING COMPARTMENT
40'
13'
10'
7'
21"
2'6"
2'
4'
14 SP. @ 3 13/16" = 4'5 3/8"

Side Elevation and Plan of Wrecking and Sand Car, Minneapolis

COMBINATION WRECKING AND SAND CAR

The Twin City Rapid Transit Company has recently completed in its shops at Minneapolis, three double-truck, combination wrecking and sand cars which are interesting in that several new features have been incorporated in their design, including a positive method of feeding the sand to the rail and accurately proportioning the amount. In addition the cars are equipped with trap doors in the bottoms of the sand hoppers so that when desired they can be used for handling hard coal and building materials, such as sand, gravel, crushed rock, cement, etc. As regular equipment, each is also provided with hose bridges, chains, jacks, tackle blocks and other small tools necessary to clear the line of a car which is stalled, or any vehicle that has broken down on the tracks.

A great many hard snow storms are experienced in this section of the country during the winter months, and under a great many conditions sand on the tracks is absolutely necessary. There are also a considerable number of bad hills, especially in the city of St. Paul, which must be kept well sanded when the weather is at all bad. The present cars were designed to carry 30,000 lbs. of sand or about 11 cu. yds. This amount, if properly used and not wasted, will last for about 10 hours, thus saving time and dead mileage which would result with a car having a smaller capacity. The cars are 40 ft. long, 9 ft. wide, weight nearly 50,000 lbs. and are mounted on two standard Twin City service trucks, equipped with four GE-216 motors. The underframing is entirely of steel as are also the side panels. The roof is of the arch type and has a radius of 9 ft. 7 ins.



Exterior Wrecking and Sand Car, Minneapolis

The interior of the cars is divided into three compartments by two bulkheads running crosswise and placed about 8 ft. from the ends. In the two end spaces the wrecking tools are kept. The center section, which is the sand compartment, has a length of 20 ft. and is built with a hopper bottom. In the floor of this compartment has been placed a cast iron auger. This is operated by a small 5-h. p. motor suspended under the car at a point just forward of the rear trucks, and moves the sand to the sand spout placed over the rail. The speed of the motor is governed by the conductor, from a controller placed in the rear compartment. By watching the rails from the rear of the car the speed of the auger can be regulated until the right quantity of sand is being fed on the rails. A headlight is placed on the rear of the car so that the condition of the track can be seen at night. The sand spout can be closed entirely by a valve operated by the conductor through a lever in the rear compartment, and this valve can also be used to regulate the flow of the sand.

Entrance into the cars is provided for by two doors on the right side near the ends. Doors in each of the bulkheads provide for access into the sand compartment. The sand or other material is loaded through a sliding door which is located also on the right side of the car. As is the case with all of the cars of this company, these sand cars are built for single end operation, and are equipped with scrapers and air and hand brakes.

One of the advantges of these cars over the usual type of sand car is that the right proportion of sand can be placed on the rail without waste or loss of time. As stated above, the uses of the cars are not confined to the sanding of the tracks alone but they can also be used for transporting other materials. For that reason their usefulness is not restricted to the winter months and they can be kept at work the greater part of the year.

WORK CAR NO. 46

12-31-1915

GENERAL DIMENSIONS		
Length over Bumpers	37' 4"	
Length over Body	26' 7"	
Length over Cab	5' 11"	Exterior
Width over all	8' 7"	
Height, floor to ceiling	6' 3"	
Height, rail to trolley board	10' 9¼"	
Truck Centers	21' 9"	
FRAMING		
Side Sills	7" 91# T Rail	
End Sills	4½" x 6" Oak reinforced with 1 1" x 5" steel bar	
BUMPER	Oak and steel	
SHEATHING		
Sides	1½" x 23" Oak, 5 hinged sections each side	
Ends	1½" X 23" Oak, Removable	
ROOF Type and Material	Flat; Canvas over Pine	
CAB		
Size	5' 11" x 7' 8" x 6' 3" high	
Material	D & M Pine	
WINDOWS		
Cab	4 Drop 21" x 34" (Side); 2 Drop 32½" x 34" (Front)	
	2 Fixed 21" x 27¼"	Rear
DOORS	1 1 1/8" x 23 3/4" x 5' 8" Oak, sliding	Reg Cab
	1 1 1/8" x 2' 0" x 6' 0" Oak, swinging	Ext Cab
FLOOR	2" Oak	
SIGNALS		
Gongs	1 12" diameter	
LIGHTS	4 36 watt Mazda	

Capacity 46-48: 50,000 lbs or 16.30 C.Y.

REFUSE CAR NO. 49

12-31-1915

GENERAL DIMENSIONS	
Length over Bumpers	37' 3"
Length over Body	28' 7"
Length over Cab	6' 4"
Width over all	7' 11"
Height, floor to ceiling	6' 8"
Height, rail to trolley board	10' 7 5/8"
Truck Centers	22' 0"
FRAMING	
Side Sills	7" 91# T Rail
End Sills	5" x 5" & 3½" x 7" Oak reinf. with 2 1" x 5" steel plates
BUMPER	7" x 9" Oak with ¼" x 7" steel plate
SHEATHING	
Sides and Ends	1/8" sheet iron, reinforced with channels and plates, 5 hinged sections each side; end hinged
ROOF Type and Material	Flat; Canvas over D & M Pine
CAB	
Size	7' 9" x 6' 4" x 6' 8" high
Material	D & M Pine
WINDOWS	3 Front + 2 Side Rear
Cab	5 Drop 28" x 34"; 2 Drop 26" x 26½"
DOORS	1 1¼" x 24" x 6' 2", hinged, 5 panels.
FLOOR	3/16" Steel
SIGNALS	
Gongs	1 12" diameter
LIGHTS	4 36 watt Mazda

Capacity 50,000 lbs or 15.54 C.Y.

WORK CAR NO. 54

12-31-1915

GENERAL DIMENSIONS	
Length over Bumpers	37' 6"
Length over Body	31' 4"
Width over all	8' 0"
Height, floor to ceiling	6' 6"
Height, rail to trolley board	9' 10¼"
Truck Centers	22' 0"
FRAMING	
Side Sills	7" 91# T Rail
End Sills	5" x 6" Oak, reinforced with 2 1" x 5" steel plates
SHEATHING	
Sides	1/8" x 23" Steel; 5 hinged and 1 lift door on each side
Ends - Rear	1/8" x 23" Steel, hinged door
Front	2" Oak planks, removable
BUMPERS	7" x 9" Oak with 3/16" x 7" steel plate
ROOF Type and Material	Flat; Canvas over Pine
CAB	4' 1" x 6' 1" x 6' 6" Pine
WINDOWS	4 Side + 1 Rear Front
Cab	5 20½" x 34"; 2 32 3/4" x 34"
DOORS	1 1 1/8" x 23" x 5' 11" sliding, 5 panel Oak, 1 glass 7½" x 14"
FLOOR	3/16" Steel
CURTAINS	1 19" x 30" Woolen Terry
SIGNALS	
Gongs	1 12" diameter
LIGHTS	4 36 watt Mazda

Capacity 51-56: 17.00 C.Y.

CUPOLA CAR NO. 58

12-31-1915

GENERAL DIMENSIONS		
Length over Bumpers	38' 0"	
Length over Body	25' 0"	
Length over Cab	10' 0"	
Width over all	8' 2"	
Height, floor to ceiling	6' 6"	
Height, rail to trolley board	10' 3"	
Truck Centers	22' 0"	
FRAMING		
Side Sills	Built-up steel girder 10" channel + 2 3/8" x 2" x 2½" angles	
End Sills	5" x 8" Oak reinforced with 2 1" x 5" steel plates	
BUMPER	Oak and steel	
SHEATHING		
Sides and Ends	D & M Pine	
ROOF Type and Material	Flat; Canvas over Pine	
CAB		
Size	7' 9" x 10' 0" x 6' 6" high	
Material	Pine	
WINDOWS	3 Front + 2 Side Rear	
Cab	5 Drop 28" x 34"; 2 Drop 26" x 26"	
DOORS	1 1¼" x 24" x 6' 0", Ash, hinged, 5 panels.	
FLOOR	Steel and Oak	
SIGNALS		
Gongs	1 12" diameter	
Conductor's bells	1 4 1/8" diameter	
LIGHTS	3 36 watt Mazda	
SPECIAL EQUIPMENT		
Cupola		1
Piqua Blower #1593, Size 4' 0", 1 G.E. Motor, Type CVC 114, Form AA 66 11.9 amps, 7½ H.P., 1125 R.P.M.		1
G.E. Starting Rheostat #111941, Type CR 1000, 7½ H.P.		1

Cupola Car 61 had the same specifications.

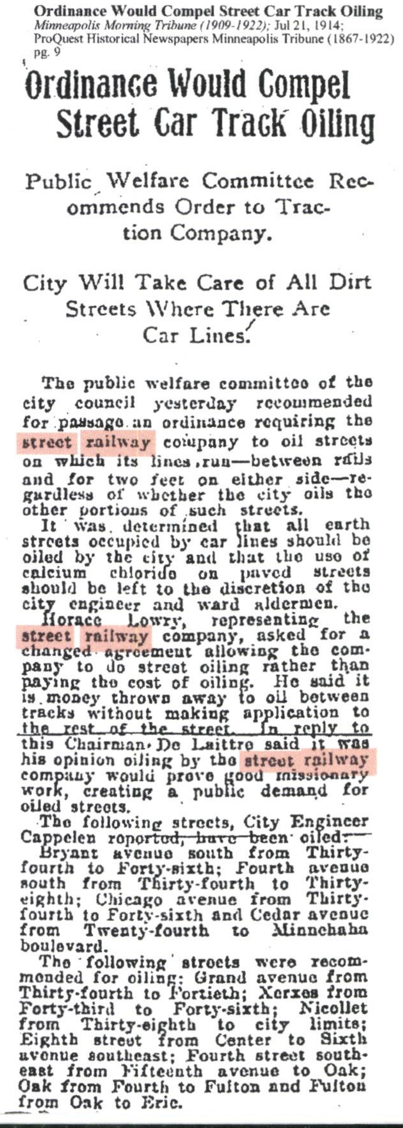
SPRINKLER CAR NO. 59
12-31-1915

GENERAL DIMENSIONS	
Length over Bumpers	36' 0"
Length of Tank	23' 0"
Length over Front Cab	5' 3"
Length over Rear Cab	5' 3"
Width over all	8' 6"
Height, floor to ceiling	6' 6"
Height, rail to trolley board	10' 4"
Truck Centers	19' 0"
FRAMING	
Side Sills	Built up ¼" x 12" plate and ¼" x 3" x 3" angles
End Sills	6" x 8" Oak and 1" x 6" Oak
BUMPERS	Oak and steel
ROOF Type and Material	Flat; Pine
CAB	Front and Rear: 5' 3" x 7' 0" x 6' 6" high; Pine
WINDOWS	
Cab - Front and Rear	5 Drop 24¼" x 36¼"; 4 Drop 28¼" x 36¼"; 4 Fixed 18¼" x 24 3/4"; 1 Fixed 24¼" x 36¼"
DOORS	2 5 panel 1 GS on each Cab
FLOOR	None
SIGNALS	
Gongs	1 12" diameter
Conductor bells	2 4 1/8" diameter
LIGHTS	9 36 watt Mazda
SPECIAL EQUIPMENT	
Steel Tank 6' 0" diameter x 23' 0" long, 5/8" steel plate	1
Christensen large Air Compressor	1

Windows

Front Cab		
Front	3	24¼ x 36¼ D
GS	1	28¼ x 36¼ D
PS	1	28¼ x 36¼ D
Rear	2	18¼ x 24¾ F
Rear Cab		
Front	2	24¼ x 36¼ D
	1	24 1/4 x 36¼ F (Heater)
GS	1	28¼ x 36¼ D
PS	1	28¼ x 36¼ D
Rear	2	18¼ x 24¾ F

Reason for building
Sprinkler Car #59



Ordinance Would Compel Street Car Track Oiling
Minneapolis Morning Tribune (1909-1922); Jul 21, 1914;
ProQuest Historical Newspapers Minneapolis Tribune (1867-1922)
pg. 9

Ordinance Would Compel Street Car Track Oiling

Public Welfare Committee Recommends Order to Traction Company.

City Will Take Care of All Dirt Streets Where There Are Car Lines.

The public welfare committee of the city council yesterday recommended for passage an ordinance requiring the street railway company to oil streets on which its lines run—between rails and for two feet on either side—regardless of whether the city oils the other portions of such streets.

It was determined that all earth streets occupied by car lines should be oiled by the city and that the use of calcium chloride on paved streets should be left to the discretion of the city engineer and ward aldermen.

Horace Lowry, representing the street railway company, asked for a changed agreement allowing the company to do street oiling rather than paying the cost of oiling. He said it is money thrown away to oil between tracks without making application to the rest of the street. In reply to this Chairman De Laittre said it was his opinion oiling by the street railway company would prove good missionary work, creating a public demand for oiled streets.

The following streets, City Engineer Cappelen reported, ~~have been~~ oiled:

Bryant avenue south from Thirty-fourth to Forty-sixth; Fourth avenue south from Thirty-fourth to Thirty-eighth; Chicago avenue from Thirty-fourth to Forty-sixth and Cedar avenue from Twenty-fourth to Minnehaha boulevard.

The following streets were recommended for oiling: Grand avenue from Thirty-fourth to Fortieth; Xerxes from Forty-third to Forty-sixth; Nicollet from Thirty-eighth to city limits; Eighth street from Center to Sixth avenue southeast; Fourth street southeast from Fifteenth avenue to Oak; Oak from Fourth to Fulton and Fulton from Oak to Erie.

Snow Plows 75-82
Photograph

Left side of the C-6-K Controller:
Headlight switch and resistors.
Lever that controlled the slides on the bottom of the salt bunkers to drop salt on the track switches when going over them. The linkage was under the motorman's raised platform.

Right side of the C-6-K Controller:
Plow-blade left-side extension up or down valve.
Air brake valve.
Plow blade up or down valve.
Hand brake wheel.

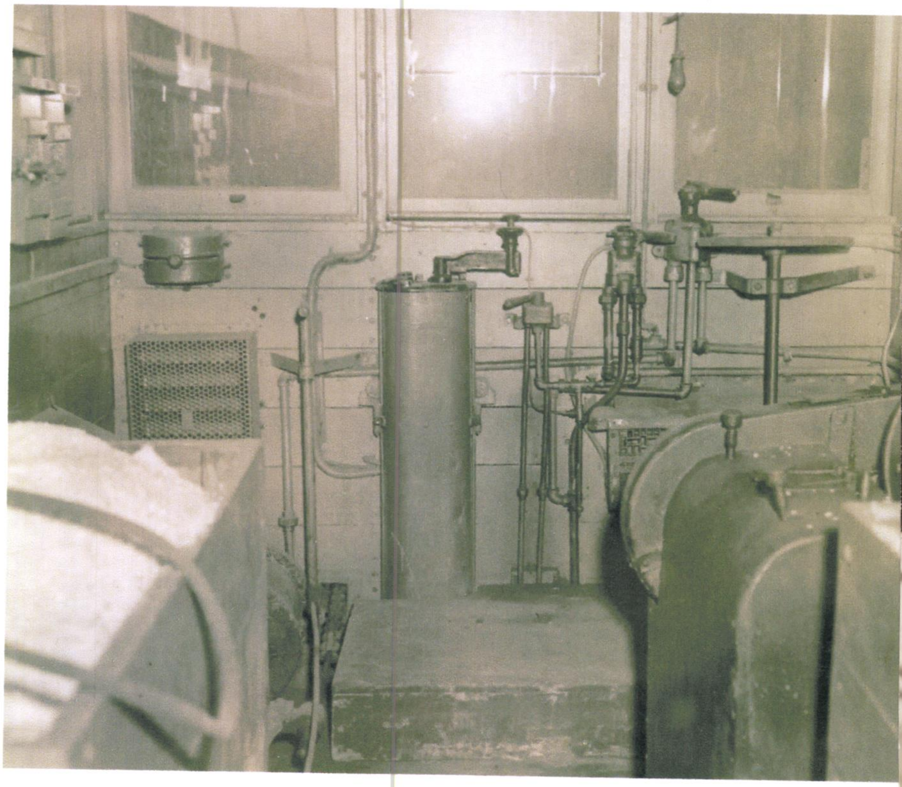
Right front side:
Side wing plow up or down motor and controls. The side wing was chain-winched out. Pulled in with rope block and tackle.

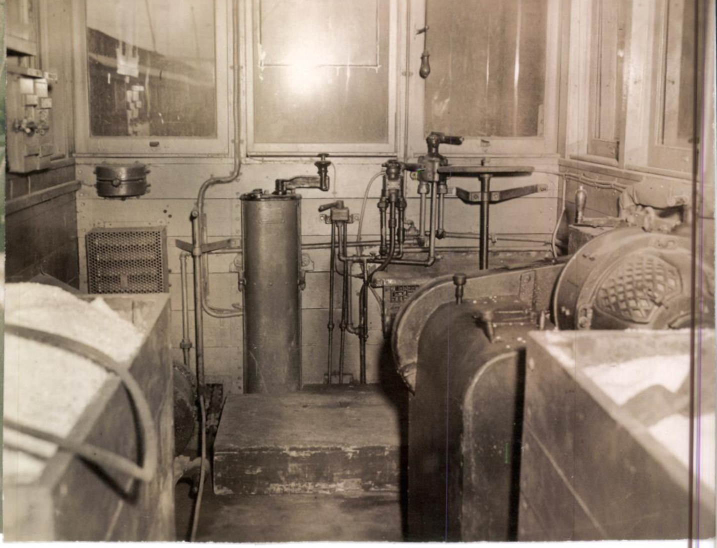
Both sides, right and left foreground: salt bunkers.

The line switch, switch group, reverser and resistor grids were mounted on brackets suspended from the ceiling and anchored to the left side wall.

The air compressor with the air reservoir tanks above it were located on the right side back of the salt bunker.

When the city used the "bobby sign" traffic signals located in the center of intersections, if a snow plow motorman failed to raise the plow-blade extension, the extension would destroy the traffic signal.





CRANE CAR 50

Original Crane was built by the Brown Hoisting Machinery Company. Powered by one 24 h.p. motor. Capacity 8,100 lbs. at 12 ft. radius and 3,600 lbs. at 26'6" radius.

Rebuilt with Orton Crane & Shovel Co. Model 8 Crane. Powered by one 30 h.p. motor. Capacity 20,000 lbs. at 12 ft. radius and 7,000 lbs. at 25 ft. radius.

WORK CARS 62-69

Capacity 50,000 lbs.

TCAT #83

The Brownhoist crane was by far the most popular crane among trolley companies. In the mid-1920s, a competitor crane emerged with a greatly advanced design. Made by the Differential Steel Co., later known as "DifCo", this was an all-electric crane. Individual electric motors, each with a drum-type rheostatic controller, power the 4 crane functions: Swing (the boom and tub can rotate 360 °), elevation (the boom can be raised or lowered 30 ° above or below horizontal), hook up/down, and travel, a helpful feature which allows the position of the hook to be traveled along the length of the boom. All of these operations can be underway at the same time, although safe operating practice dictates limiting the number of operations to less than or equal to the number of appendages one has free to operate the handles.

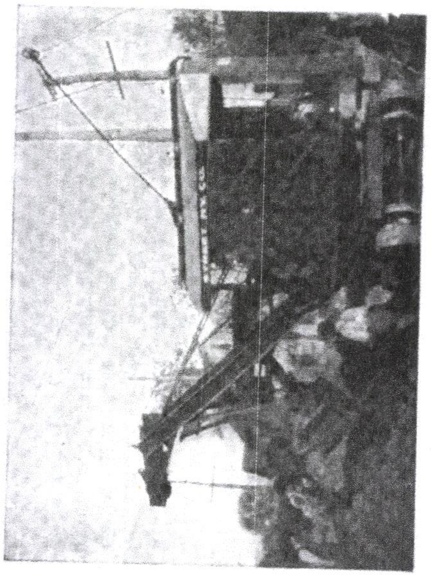
All in all, the Differential crane was vastly superior to the Brownhoist.

57, 60, 73

Electric Shovel for Railway Work

In 1903 the Thew Automatic Shovel Company, Lorain, Ohio, manufactured its first electric shovel, and this proved to be so successful that another type was brought out, this being similar in fundamental design, but modified in many respects to adapt it to the particular requirements of electric railway service. This shovel likewise was a success and at the present time many of the larger city and interurban lines of the country use it to handle all their excavating.

The horizontal "crowding" motion which is one of the features mainly responsible for this shovel's success, has proved to be ideal for digging shallow cuts, track trenching, grading interurban roadbeds, and for speed in performing the various kinds of work encountered in city and interurban lines. By reversing the crowding motion, an extremely powerful prying action is obtained which affords the most economical method known for tearing up concrete and track ballast, the shovel being frequently used for removing old rails and ties.



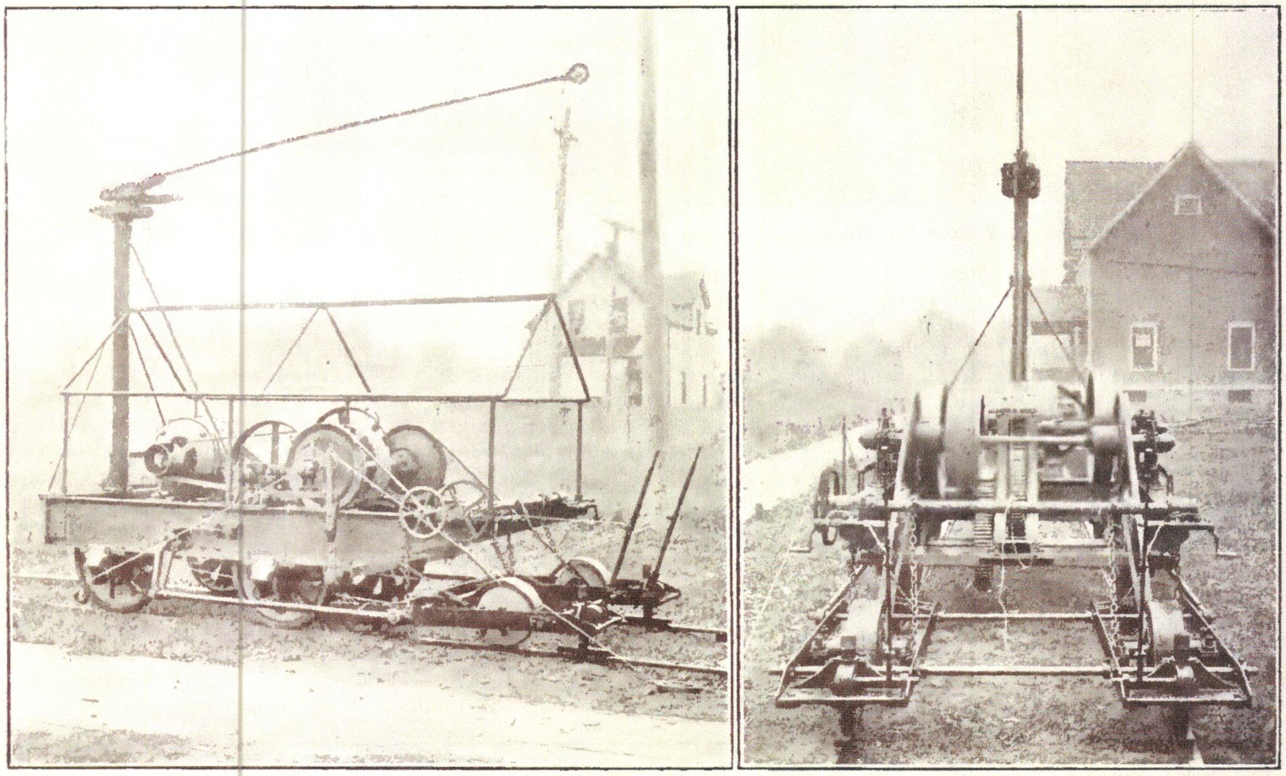
ERJ AUTOMATIC ELECTRIC SHOVEL 10-2-1915

It is of the full-circle-swing variety and is very compact, features of great advantage in through-cut work or places of limited working space, and it also has a special jack-knife boom that will swing under trolley wires. In addition to handling all kinds of excavating, the shovel can be used for loading coal from stock piles, for handling pile drivers and for limited crane service. It is self-propelling, operated by one man, mounted on traction or car wheels or both and has proved to be a very profitable investment for even the small railway that has comparatively little excavating work to do.

KERWIN-DETROIT RAIL GRINDER

The Kerwin Machine Company, of Detroit, Mich., of which John Kerwin, superintendent of tracks Detroit United Railway, is an executive, has recently built and sold a number of machines for grinding track rails. By the use of these machines a number of railways have been able to extend the life of existing tracks for several years. In Detroit many miles of track so badly cupped at the joints that the rails had been condemned and ordered replaced were saved by the use of the rail grinder. The joint plates were first stepped so that the bottom of the cups on the receiving rails were brought to the level of the uninjured delivering rail. After the stepped joint plates had been tightened the Kerwin rail grinder was used and the cups were ground out of the receiving rail. The joints were thus brought to the surface of the track.

The rail grinder has other uses besides that of renewing old joints. It has been found profitable to grind new joints to a true surface because the tendency to batter and cup is thereby delayed. Similarly, the grinding of special track-work rail heads, joints and hard centers is profitable because it improves the riding qualities of the track work and prolongs the life by removing any unevenness which may cause vibration and destruction of the rail head. Several of the larger city properties have purchased these rail grinders for removing corrugations from different classes of track work. The cost for grinding out corrugations is said to be from 1½ cents to 2¼ cents per foot of rail according to the depth of the waves.



Rail Grinder—Side and End Views

Accompanying engravings illustrate the appearance of the rail grinder arranged for operation. Briefly described it consists of a steel underframe mounted on four car wheels, a driving motor and a group of friction wheels and driving belts which operate emery wheels supported by a carriage which slides along the track rails. The machine is designed with a view to operating from one part of a railway system to another part under its own power, at which times the grinding-wheel carriage is raised clear of the track, as illustrated.

The main framing of the grinding machine consists of two side sills, which are I-beams 15 in. deep and weighing 42 lb. to the foot. This frame is 13 ft. long over all. The end members are 15-in. 33-lb. channels and the intermediate cross-members are 12-in. 31.5-lb. I-beams and a 9-in. channel. The motor is mounted on a subframe built of 6-in. I-beams and covered with a ⅜-in. plate, 38 in. x 29¼ in. in area. The trolley stand is made of extra heavy 5-in. pipe and is 7 ft. 6 in. high. Its base is bolted to the heavy end sill of the underframe and is guyed in three directions. The post fits over a casting which is bolted to the end sill so that a very secure support is given for the trolley base. With each rail grinder the manufacturer supplies a Bayonet trolley harp, stand and wheel.

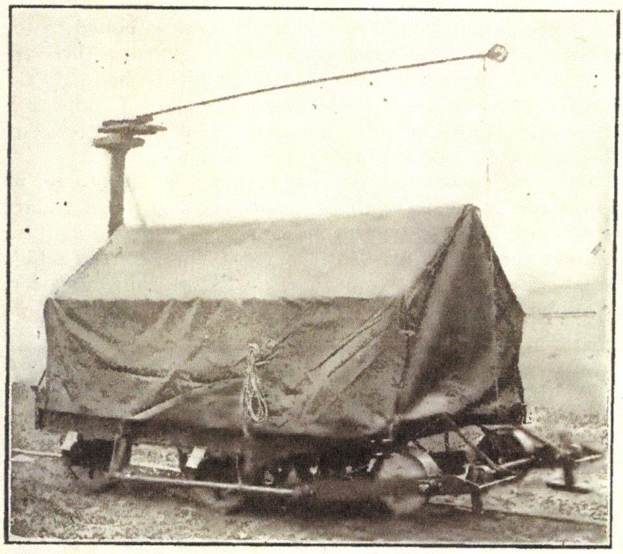
The underframe of the rail grinder is supported on 4-in. street-car axles equipped with 33-in. 500-lb. standard street car wheels and journal boxes. This running gear permits the operation of the car at comparatively high speeds on long runs from one part of the railway system to another.

The motor, mounted on top of the frame, is used to move the car along the rails. Power from the motor is transmitted through a belt, friction pulleys and reduction gearing to a standard street railway split gear on one of the main axles. This gear is 23 in. in diameter and has a 4½-in. face and sixty-nine teeth of three pitch.

Friction clutches and other transmission mechanisms are designed to provide either continuous movement of the car in either direction or a movement alternately back and forth over the short length of track or joint which is to be ground. Provision is also made for continuously driving the emery wheels while the car is moving forward and backward or letting them remain idle while the car is being moved from one end of the road to the other.

The transmission gearing may be described briefly as follows: A belt from the motor drives the upper or main shaft, shown in the end view of the grinder. This shaft carries two paper friction pulleys, each about 6 in. wide, and two larger pulleys which are fitted with narrow V-shaped belts for conveying power to the emery wheels.

Thus the grinding wheels are driven at high speed through the single intermediate shaft between them and the motor. The friction pulleys deliver power as desired for moving the grinder along the track. Two large iron pulleys are mounted with their journal boxes on guides so that they may be thrown against the small friction pulleys as desired. The shaft of each of the large friction pulleys connects through a universal joint with the main train of gearing. One of the friction pulleys drives through a single intermediate pinion and the other through two pinions. Thus when the first friction pulley is transmitting power it will move the car in one direction, while the use of the other pulley with its train of two pinions will move the car in the opposite direction. One of the gears in the train leading from the pinions on the friction pulley shafts to the gear on the car axle is fitted with a clutch which permits the grinding wheels to be run while the car stands still.



Rail Grinder—View with Housing

The machine does its work automatically and but one man is required to set and operate it. A lever at the side of the frame controls the forward and backward movements. Two ropes with weights attached are usually employed to throw this lever at the end of the travel of the car. The reversing gear is so nicely adjusted that a pull of a few ounces only is required to operate it.

The carriage for the grinding wheels [illegible] nade of angle irons tied together with [illegible] rods. It is 5 ft. 10 in. long and is [illegible] lependent of the main frame of [illegible] except for the push rods, which [illegible] nected. Flexible connections [illegible] ding carriage remove the pos[illegible] he smoothness of g inding being [illegible] ny jarring of the car. The grin[illegible] rests on four 14-in. shoes whi[illegible] he tops of the rails. Two of [illegible] are adjustable for height by m[illegible] racks and pinions, which may be o[illegible] ated through direct levers or by m[illegible] of small windlasses which wind rope [illegible] ng through pulleys on the adjusting lever. The [illegible] sses are located on the ends of the grinder frame.

The emery-wheel shafts have bab[illegible] boxes designed to provide easy adjustment for vario[illegible] es and different widths of track. As earlier stated, [illegible] emery wheel is independently driven at a constant speed irrespective of the movement of the machine along the track. Either emery wheel can be raised or lowered or moved forward or back to grind staggered joints. The head of the rail is ground while the car is moving in either direction.

The machine may be set so as simultaneously to grind a high joint on one rail and a low joint on the other rail and do its feeding automatically.

◆

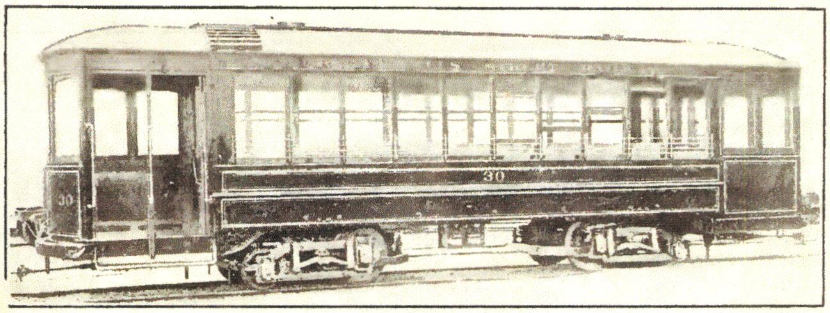
CARS FOR GREAT FALLS, MONT.

The Danville Car Company has recently completed for the Great Falls (Mont.) Street Railway eight semi-convertible cars of the type shown in the accompanying illustration. The principal dimensions are the following: Length of car body over the end panels at the sill, 25 ft. 9 in.; length of the car body over the platform crown pieces or outside vestibule sheathing, 38 ft. 9 in.; width of the car at the sill, including the panels, 7 ft. 11½ in.; width of the carbody over the posts at the belt rail, 8 ft. 2 in. Mutually operating double sliding doors are provided at each end of the body. Both sashes of each window are arranged to slide into the roof.

The bottom framing consists of 4-in. x 7¾-in. yellow pine side sills plated with ⅜-in. x 12-in. steel; 5¼-in. x 7¾-in. white oak end sills and center cross pieces of 3½-in. x 5⅞-in. white oak. The body framing has 3¾-in. corner posts and 3¼-in. side posts. The sweep of the posts is 1¾ in. Ash ribs, ⅝ in. x 1¾ in., are placed on the concave panels. They are mortised into the sills and fastened securely on the concave rails without screws. The center panel ribs, which are also ⅝ in. x 1¾ in., are mortised into the belt and concave rails. A sheath of No. 20 sheet steel is applied to form the bottom panel. The floor boards are of 13/16-in. narrow yellow pine covered with hardwood tapered floor mat strips, ⅝ in. at the top and ¾ in. at the bottom. The roof is of the Brill arch pattern without side ventilators. Three-ply birch veneer is used for the interior finish. Eight transverse reversible and two stationary longitudinal seats, all of rattan, seat forty persons.

Each platform is 6 ft. 6 in. long. The dashers are of No. 14 sheet steel and extend around one side, leaving step openings at the right-hand side facing the car; the dasher rail at the left-hand side is secured to the carbody. The vestibules are of the round-front type with a narrow center post to separate the entrance and exit step. The step openings are inclosed by folding doors, while the opposite closed side of the vestibule has two drop sash windows.

The cars are mounted on Brill No. 39-E single-motor trucks of 4-ft. 6-in. wheelbase, which will be operated over curves of 35-ft. radius. These trucks have 33-in. diameter chilled-iron drivers and 21-in. ponies. The diameter of the driving axles is 4½ in. and of the pony axles 3⅞ in. Among other Brill specialties on these cars are fixed link drawbars, angle-iron buffers, sand boxes, signal bells and "Dedenda" pedal alarm gongs. These cars are also equipped with Peacock brakes, Hunter destination signs and Consolidated electric heaters. The approximate weight of the carbody, exclusive of the trucks, the motor and control equipment, etc., is 15,000 lb.



One of Eight Arch Roof Cars for Great Falls, Mont.

EXTERIOR AND INTERIOR DETAILS

EXTERIOR DETAILS

EXTERIOR PAINT COLORS

Body: Light Chrome Yellow. Trim above the floor line: Medium Brown and Olive Brown. (Olive Brown was a special paint used only on the letterboard eaves drip rail and the two half-oval drip rails on the belt rail, the moldings which shed water so as not to come into direct contact with the car sides.) Body and deck roof window sash: Cherry. Roof canvas: Red Iron Oxide. Equipment below the floor line, bumpers, gates, steps, headlight, trolley retriever, truck frames, fender, etc.: Moss Green. Numbering and striping: Aluminum with Bronze outlining around the numbers.

Car 1788, the front-exit door experiment in 1918, eliminated the Aluminum striping and the car number was Medium Brown. Beginning with the front-exit door rebuilding program, including the trailer trains, in 1920 this became the new standard. Also the front-exit doors were Moss Green so the hinged motorman's cab doors were repainted Moss Green.

Folding doors on the lightweight cars had a Natural Wood finish until 1948 when they were repainted Light Chrome Yellow.

In 1925 the three sample cars for the Grand Rapids Railroad, Grand Rapids, Michigan, were each painted in the state university colors of the carbuilder. 375 MINNESOTA was painted Gold with Maroon trim. An elderly railfan recalled seeing cars 1-4 in Stillwater local service similarly painted. Comparison of photographs of 375 on page 544 with TCRT 1-4 on page 265 and DSR 301-305 on page 401 indicates all three color schemes were identical.

The folding doors on cars rebuilt for one/two man operation were Light Chrome Yellow above the side-sill bottom line and Moss Green below.

Beginning in May 1947 Twin City Lines emblems, colored Black and Red and Gold, were placed on all steel-side cars and lightweight cars which were rehabilitated or completely repainted.

Striping Brown
Enamel replaced
Medium Brown

The car numbers were large and widely spaced apart. Beginning 9-10-1947 this was changed to smaller numbers closed spaced together. The following is a summary of the results.

Striping Brown
Enamel replaced
Medium Brown

Large, wide spacing:
- all cars scrapped thru 1948;
- of 125 front-exit gate cars left in 1949, 77 cars retained the large numbers;
- car 1136;
- 2000 series lightweight cars without TCL emblems;
- wood-side cars: certain cars rehabilitated during 1945 through 1947.

Small, close spacing:
- all cars with TCL emblems and other rehabilitated cars from 9-10-1947 onward, including 1230;
- most repainted cars or cars with sides coated.

When repainting of cars and buildings was completely discontinued in early 1952 a list was compiled of the paint inventory returned from the shops to the storehouse for disposition. A copy of the items on the list pertaining to the streetcars is appended.

Different Color Schemes

Red, White and Blue War Bond Cars: 1506 and 1695 painted 12-1-1942. Both were repainted in the standard Yellow color scheme about June 1944.

February-July 1952: 1209 had its steel side plating completely around the car repainted White. Army and Air Force lettering and decals advertising recruiting were then applied on the sides.

STOP 10 FEET BACK was painted in Medium Brown on the exterior right rear platforms below the belt rail of 723 cars during 1937.

FRONT PLATFORM MOTORMAN CAB DOOR

Narrow hinged door, 22" x 5'7", on cars 737-788,797-867,900-951.
Narrow hinged door, 22½" x 5'7", on cars 868-899.
Wide hinged door, 2'9" x 5'7", on cars 952-1041.
Wide hinged door, 2'8 3/4" x 5'7" on cars 1042-1111.
Wide hinged door, 2'9" x 5'8¼" on cars 1112-1144.
Wide hinged door, 2'9½" x 5'9½", on cars 1145-1220.
Wide hinged door, 2'8 3/4" x 5'8", on cars 1221-1309.
Wide hinged door, 2'9" x 5'8", on cars 1310-1379.
Wide hinged door, 2'8 3/4" x 5'8½", on cars 1380-1449,1451-1485.

Sliding door, 2'8¼" x 6'3", on cars 1450;2nd1482-1485;1486-1855.

According to an article in the March 1, 1912, Minneapolis Journal the annual cost of glass breakage was considerable on cars with the hinged motorman's cab door. Thus TCRT decided to construct all future cars with a sliding door entrance to the motorman's cab.

CAR SIDES AND ENDS

Side and end sheathing on the standard passenger cars were of 9/16" x 2¼" whitewood.

During the rehabilitation programs from May 1938 through June 1950 the wood side and end sheathing was replaced with 1/16" steel plate on those one/two man cars on which most of the wainscot was found to be rotting. The first two cars so treated were 1724 and 1759. 1724 was done first and had straight end panels. These were later changed to sloping panels to provide a "streamlined" appearance. All subsequent cars, including 1759, had the sloping end panels. On three cars done in 1939, 1543, 1570, and 1834, had the seams welded instead of riveted to give a smooth appearance. This made it too difficult to remove sections for maintenance. 1545 was changed back to riveted seams in 1944 and 1570 in 1949, but 1834 was wrecked before this could be done. A total of 286 cars received steel side and end panels; these are identified in the section Building, Rebuilding and Disposition Dates.

The side and end panels on all Lightweight cars ~~was~~ were of Masonite board.

STORM SASH, SCREENS AND WINDOW GUARDS

Cars ~~1425 and up~~ up to 1424 had full-length storm sash while ~~1424 and below~~ 1425 and up had only the lower sash protected by storm sash.

Starting in 1945 237 cars were fitted with window guards made of ¼" steel rods instead of the previous wire screens. The new guards were hinged at the bottom so they could be swung down over the car side when windows were washed, whereas the screens had to be removed entirely.

FRONT AND REAR BUMPER MODIFICATIONS

Installation of a sloping sheet-metal trim piece apparently started with the rear bumper only when cars 1310-1359 were built. It was probably first tried on the front bumper of a few cars rebuilt with front-exit doors in 1928 (1254,1266-1328). A photograph of 1274 on page 282 shows it with the sloping trim piece. Apparently these cars also did not have the sloping trim piece installed on the rear bumper.

These sloping trim pieces were used on all cars rebuilt for one/two man operation. Existing front-exit gate cars were refitted as they were rehabilitated. Originally both bumpers wrapped around the entire platform. However this was not the situation on the cars rebuilt for one/two man operation. (Refer to photographs of the "pole side" of these cars.) Successive rehabilitations of front-exit gate cars had either one or both bumpers modified to match the one/two man cars. Individual car results seem to depend upon what work the shopmen felt doing at the time. Ed Nelson has attempted to record these individual variations and the results are appended. [redacted] Following are his observations pertaining only to cars 1254,1266-1292.

As of 1940: front bumper as originally built: 1268,1278,1279,1285-1287,1289-1290; rear bumper as originally built: 1254,1268,1279,1284-1291. Apparently all were modified during their rehabilitations in 1942 and 1946-1947 except at that latter date 1289 had its original rear bumper but the bumper did not wrap around the entire platform.

TROLLEY BASES, TROLLEY WHEELS AND TROLLEY RETRIEVERS

The first trolley poles were made of wood. Beginning in May 1902 trolley bases were changed to accomodate steel trolley poles.

Trolley Bases

"Old Style":	Service Cars 26-28,A13,A14.
G.E. #6:	737-772,786-788,797-1111,1124-1144. Service Cars 2-5,7-16,25,34,49,50,70.
Sterling-Meaker:	Private Car,773-785,1112-1123,1169-1195. Service Cars 21-24,29-32.
G.E.:	Service Car 35.
G.E. R.B.:	1145-1168,1196-1481. Service Cars 17-19,33,43-45. Rebuilt front-exit door cars 1254,1266-1375.
G.E. #13:	1482-1855,2000-2001,1-4. Service Cars 58,59,61, UofM Switch Car. Rebuilt front-exit door cars 1376-1854.
U.S. #13:	Service Cars 51-56,62-69,72,75-83.
G.E./U.S. #13:	Service Cars 36-38,46-48.
U.S. #15:	2002-2003.
U.S. #20:	2004-2030.

U.S.: UNION STANDARD/
R.D. NUTTALL CO.

Trolley Wheels

4" diameter trolley wheels were used on 737-788 and 797-1429. Kalamazoo trolley poles and 4" trolley wheels appear in the valuation reports. TCRT then began manufacturing 7" diameter trolley wheels and these were placed on all subsequent cars from 1430 upward. 1112-1429 were next re-fitted with the 7" trolley wheels. Stillwater Division cars received them in 1910. Cars 1007-1041 were later fitted with 7" trolley wheels. In 1918 a trolley shoe was tested on 1760 but found unsatisfactory. Sleet scrapers were carried on all cars during the winter months.

From the equipment data sheets:

4" trolley wheels:	Private Car,737-1111. (1007-1041 got 7" later). Service Cars 2-5,7-19,21, 25-28,33,35,49,70,A13,A14.
7" trolley wheels:	1112-1854,2000-2030,1-4. Service Cars 22-24,29-32,34,36-38,43-56,58-59, 61-69,72.

BRAKES

Hand brakes were used exclusively, except on the Private Car and Stillwater Division cars [redacted] until 1902. The first experiments with air brakes on local cars were made in January 1901. Magnetic track brakes were tested in October 1902; at first termed successful, they were shortly dropped from consideration. The first local cars equipped with air brakes were 900-949 built during 1902. All subsequent new car orders were equipped with air brakes. During 1902-1903 all older double-truck cars were equipped with air brakes and whistles: 608-626,737-772,786-788, 797-899. (134 cars were so equipped during 1903).

Air compressors used were: Christensen (Private Car,737-788,797-1195); General Electric (1196-1254,1266-1290); G.E. CP-21 (1255-1265,1291-1429); Allis-Chalmers AA-6 (1430-1481); G.E. CP-27 (1482-1631,2000-2001); G.E. CP-25 (1632-1855,2002-2030); National AA-1 (1-4) and National AA-2.

Trolley Retrievers

Retrievers were being installed on cars in 1914, if not earlier. Some 1200's and 1300's were receiving them then. In 1927 Knutson trolley retrievers were being put on cars with some being ordered for many 1000's but not for some 1100's or 1200's. Final trolley retriever installations were made in July 1929 on "Bryn Mawr" line cars 985-990. Knutson #2 and #5 Trolley Retrievers were used; trolley rope was #8 and #10 Spot Cord.

HEADLIGHTS

Carbon Arc Headlight Manufacturers: Wagenhals, Mosher (12"), Twin City, Twin City Luminous.

2-13-1906: an incandescant light was being fitted in the arc headlight on suburban cars. The incandescant light was to burned from (1) 7th and Wabasha Sts. to 7th St. and Duluth Ave., St.Paul; (2) Owen St. Station to Union Depot, Stillwater; and (3) 6th St. and Hennepin Ave. to 31st St. and Irving Ave., Minneapolis.

When cars were rebuilt with front-exit doors and steps from 1920 onward, headlights were changed to the incandescant type. New Golden Glow headlights were first installed during December 1920. Suburban cars received Golden Glow headlights: December 1925 on 1112-1123,1255-1265; and April 1926 on 1145-1163.

Incandescant Headlight Manufacturers: Local (photo of 1132 on page 260), Dayton, Mazda, Crouse-Hinds, Golden Glow, Twin City.

TAIL LIGHTS

In the early years red lanterns were hung on brackets on the rear of cars at night. Men were stationed at downtown street corners to put these on the cars at night. All deck roof cars had red glass in the rearward facing clerestory sash.

The first electric tail lights were installed on 608-626,737-788,797-1309 beginning in March 1910. Such work was still in progress as of June 1911. These lights operated from batteries and were used for many years.

In 1927 an air-operated stop light was tried out on 1391 at North Side Station.

In 1937 reflectors were authorized for 722 cars and these were all installed by October 1938. The tail lights were then incorporated into the lighting circuits and the batteries removed.

AIR COMPRESSORS

The original installations were by the Christensen Engineering Company. By 1904 it had been acquired by the National Electric Company.

Christensen: Private Car,737-1188. Service Cars 2-5,7-19,22-24,34,36-38,46-56,58,61-63,72, A13,A14. Christensen AA (sic): Service Cars 64-69.
1921: National AA-1: 737-899,947-949,952-991. Service Cars 2-5,22,46-48,62-69,A13,A14.
1921: National AA-2: 900-946,950-951,992-1107,1122-1144,1164-1195. Service Cars 7-16,34,36-38, 49,58,61,72.
Record Cards: 1112-1123,1145-1163 typed over with G.E. CP-21C.
1921: G.E. CP-21: Service Cars 17-19,23-24.

1921: G.E. CP-25: Service Cars 50-56.

General Electric: 1189-1290,1371-1375. Service Cars 21,29-33,43-45.
1921: National AA-1: Service Car 33.
1921: G.E. CP-21: Service Cars 21,29-32.
1921: Allis-Chalmers AA-6: Service Cars 43-45.
Rebuilt front-exit door cars 1254,1266-1328.

G.E. CP-21: 1291-1370,1376-1429.
1921: G.E. CP-21C: 1112-1121,1221-1254.
1921: G.E. CP-21: 1145-1163,1196-1220,1255-1421.

Allis-Chalmers AA-6: 1430-1481 (1921: 1422-1481). Service Cars 75-82.

G.E. CP-27: 1482-1631,2000-2001. Service Car 83.
1921: G.E. CP-27C: 1482-1553.
1921: G.E. CP-27: 2000-2001.
Rebuilt front-exit door cars 1482-1599,1626-1629.

G.E. CP-25: 1632-1854,2002-2030. Service Car 59 and UofM Switch Car.
1921: G.E. CP-25: 1554-1854,2002-2003 (2004-2030 not yet built).
Rebuilt front-exit door cars 1600-1625,1630-1854.

National AA-1: 1-4.

National Automatic: Locomotive 20. (1921: National AA-1)

Not specified: Snow Plow 25.

Hand brakes only: Service Cars 26-28,35,70.

From the various valuation reports these were the model numbers of G.E. Air Compressors used: CP-21A, CP-21B, CP-25, CP-25C, CP-27 and CP-27A.

Whistles

The earlier TCRT built passenger and service cars had short high-pitched whistles. All passenger cars and most service cars later received long low-pitched whistles.

June 3, 1910: all "Fast Cars" to get long, deep-toned whistles (1½" x 12").

January 1931: Westinghouse pneuphonic horns were installed on 1265 and shortly after on 23 additional suburban cars: 1112-1113,1115-1123,1145-1146,1160-1163, 1257, and 1260-1264.

March 1932, Authorization 6058: whistle valve foot levers for 2000-2030. Completed by December 1933.

BRAKE CYLINDERS

Passenger and Service Cars as built:
- One 8": 737-772,786-788,797-899,952-991,2000-2001. Service Cars 2,62-69,A13,A14.
- One 10": Private Car,773-785,900-951,992-1144,1146-1854. Service Cars 3-5,7-24,29-34, 36-38,43-56,58,59,61,72,UofM Switch Car.
- One 12": 1145 (double deck).
- One 14": Service Car 83.
- Two 8": 75-82 (one per truck); side wings operated by one 10".
- One 7" balanced: 2000-2030.
- One 6": 1-4.

Front-exit doors rebuilding 1920-1924:
1329-1854; two cylinders replaced one cylinder: 6" on newer, lighter cars, 7" on other cars.

Changes on front-exit gate cars rehabilitated 1926-1928 (526 cars):
1329-1554 from two 7" to two 7¼". (1329-1629 per the equipment data sheets.)
1555-1854 from two 6" to two 7" from 1329-1554. (1630-1854 per the equipment data sheets.)

Front-exit doors rebuilding 1928: 1254,1266-1328 remained at one 10".

One/Two Man rebuilding 1935: numbers ranging from 1219 to 1408, two 8½".

Subsequently all cars, 1166-1253,1329-1854 received two 8½" (almost completed by 1939).

18 cars Dec 1906
779-785
1113-1123

RAILROAD-STYLE PILOTS

The first such pilot was installed on 1112 September 1906. Beginning in December 1906 eighteen cars were to be equipped with pilots and nose plows. This order was later increased to 28 cars. The Private Car received a pilot May 1908. Cars 1159-1160 received pilots June 1908. The 37 ft. cars at Owen St. Station, Stillwater, received pilots and nose plows in December 1909.

We know pilots were installed on (1) some or all of 773-785 used on the Stillwater Division; (2) Private Car, 868-874,1112-1123,1145-1163,1255-1265, Work Cars 11-12, Baggage Car 34, and the University of Minnesota Switch Car.

ELECTRIC CLASSIFICATION LIGHTS

A S.W.O. dated May 1908 provided for cars to be equipped with "side lights and brackets".
A. Lake Minnetonka Division: 19 cars and 1 Wire Car. The order was increased the following month to 21 cars.
B. Stillwater Division: 15 cars. The order was increased the following month to 17 cars.

A bulletin dated March 11, 1910, stated that all cars on the Lake Minnetonka and Stillwater Divisions were being equipped with electric classification lights. This involved 1112-1123, 1145-1163, 1260-1265 and apparently 1164-1168. 1255-1259 were so equipped later when they were converted to high-speed suburban cars. The following equipment was needed for each car. Two yellow targets, two green targets, two white targets, two green lenses, and two white lenses for the classification light castings; red targets with silver numbers 1 through 10 to designate run numbers. The marker brackets being taken off these cars were to be used on the telephone booths (purpose unspecified).

In addition the Private Car and the following Service Cars received electric classification lights: Work Cars 11-12, Wire Cars 3-5 and 72, Underground Wire Crew's Work Car 33, and Sand Cars 43-45. All Snow Plows had electric combination clearance and classification lights.

The equipment data sheet for 1164-1168 shows and lists them with electric classification lights (no railroad-style pilot). Equipment was Baldwin #1 trucks, G.E. 70 motors and K-28 controller. There is a notation that 1164 was subsequently changed to marker brackets. The first car assignment list we have is dated 11-16-1909 at which time all five cars were assigned to Snelling Station. As of 1-18-1911 they were used on the "Interurban" line. We do not know the reason for classification lights on these five cars.

MARKER BRACKETS

A bulletin dated March 29, 1910, stated that new cars 1421-1430 were being assigned to the E. 7th St. Station for Stillwater extras. The signal light brackets, targets, lamps, etc. being removed from regular Stillwater Division cars [773-785] were to be placed on these new cars. A further bulletin dated May 20, 1911, stated that 1416-1424 had been used during 1910 on the Stillwater line; the marker brackets were to be removed from 1416-1420 and placed on 1425-1429, and new marker brackets were to go on 1430-1435. May 22, 1912, 1437-1438 received marker brackets; August 27/31,1912, new cars 1567-1571 received marker brackets, all for this Stillwater extra service.

In addition every Sunday and holiday Snelling Station furnished 15 cars as "followers" for the Stillwater line.

Marker brackets were installed on 868-874 for service on the Stillwater local lines.

Marker brackets were installed on 1370-1386 assigned to East Side Station for service on the Lake Minnetonka line. In 1923 1367-1374 were in service on the St.Louis Park line. 1372-1386 were transferred to North Side Station 12-3-1928; for July 4, 1929, service on Lake Minnetonka line 1372-1374,1376,1379-1386 were temporarily transferred to East Side Station.

Cars in service on the St.Louis Park and Robbinsdale lines used oil classification lights inserted into the marker brackets. The following is a chronological listing of cars used on these lines and notated if we know for certain they were fitted with marker brackets.

St.Louis Park line

1910: 752,760-765 (oil classification lights).
October 1910: 760-763 (oil classification lights).
May 1912: 760-764,827-832,1539-1541 (oil classification lights).
January 1913: St.Louis Park destination signs placed on 910-914.
April 1913: 910-913,1539-1541 (oil classification lights).
9-1-1913: 911-914.
5-30-1923: 1367-1374 (also after rebuilding with front-exit doors).
1928: Used some of 1185-1192 which were also used on the Inter-Campus line.
Used marker brackets until circa 1930.

Robbinsdale-St.Louis Park line

1-1-1916: 814-815,911-913.
1916: 814-816,911-913,1538-1544.
7-19-1917: 752,815-816,911-913.

Robbinsdale line

By 8-2-1921: assume 1391-1395 so equipped when 1538-1544 were transferred to Lake St. Station.
November 1921: 1396-1397.
5-30-1923: 1032-1035,1391-1397. (May have included 1036-1037.)
1930: 1180-1184,1188-1192. Five regular cars were 1183,1188,1190-1192 which had G.E. 216 motors.
Used marker brackets until circa 1930.

Cars 1079-1084 and later 1189-1194 used in the Inter-Campus Special service during the 1919-1924 time period were equipped with marker brackets.

Most, if not all, the Work Cars had marker brackets as did Baggage Car 34, Wrecker-Crane 21, Refuse Car 49, and all Snow Plows except 75-82.

A company bulletin dated May 9, 1921, stated that all large cars with front-exit doors and G.E. 200 type motors assigned to Duluth Ave. station were to get brackets for signal targets by May 28th for Memorial Day service and summer seasonal service on the Stillwater Division. A total of 58 cars was involved but the list was not included. Based on the car assignments these were the 58 cars: 1556,1558,1560,1563,1570,1579,1589,1608,1609,1616,1628,1635,1639,1641,1645-1649,1651, 1654,1656,1658,1662,1664,1673,1674,1678,1679,1683,1684,1696,1719-1721,1724,1738,1743,1755,1757, 1759,1777,1781-1783,1786,1796,1800,1801,1805,1808,1809,1811,1813,1815,1840,1841,1844. Photographs also indicate 1501,1636,1650 had marker brackets.

The foregoing probably applied to the summer of 1921 only as there were large scale transfers out of Duluth Ave. Station 8-30-1921; most of the cars went to Snelling Station. Standard cars 1289-1330 were transferred to Duluth Ave. Station to replace them. By May 1923 1331-1332 had been transferred from Nicollet Station to Duluth Ave. Station. We know that 1289-1332 were equipped with marker brackets for "St.Paul-Wildwood" service.

Apparently many of the cars originally equipped with marker brackets retained them through successive rehabilitations. As late as the 1940's and 1950's the following front-exit gate cars still had marker brackets: 1333,1352,1358,1362,1368-1371,1374,1375,1380,1381,1405,1406,1409-1412, 1414,1418,1421-1423,1436,1456-1458,1463,1472,1474,1476,1477,1483,1484,1563. (1271 had them added in October 1951 for railfan trips and retained them until dismantled and burned in July 1953.)

One/Two Man cars used on the Hazel Park-Mahtomedi line from 9-8-1934 thru 11-3-1951 had marker brackets: 1211,1213-1218,1233,1235,1238-1243,1382,1385,1391,1393,1398,1608,1610,1617,1618, 1622-1624,1627-1631,1633-1635,1809-1815,1821-1822,1825,1832,1840.

PHOTOGRAPH OF 1853 AS
FRONT-EXIT CAR WITH MARKER
BRACKETS. 1830-1854 WERE
ASSIGNED TO DULUTH AVE.
STATION 1921-1931

INTERIOR DETAILS

INTERIOR FINISH

The interior woodwork of all the standard passenger cars was of birch, with a cherry finish.

In 1930 this was changed to a lighter brownish-cherry color with natural wood finish. The first car refinished was 1495 on July 19th; it was specially transferred from Snelling Station to East Side Station for use on Hennepin Ave. lines so that Horace Lowry and T. J. McGill could easily inspect it. On subsequent rehabilitations front-exit gate cars, one/two man cars and lightweight cars were refinished. The few metal surfaces such as heat ducts, back-up control box, switch box, etc. were painted to resemble wood surfaces.

The headlining was originally a varnished natural wood finish with cherry striping. They were repainted both white and ivory beginning in 1935. The first cars done were 1385, ivory, August 1, 1935, and 1509, white, on September 28, 1935. White eventually became the standard color.

The entire interior woodwork of two cars was refinished in green (headlining remained white) during 1945, experimentally called a "PCC Finish". These were done about the time PCC car 299 was repainted in TCL colors. 1749 was completed May 28, 1945, and 1441 on August 1, 1945. 1749 reverted to the standard interior finish in 1950 but 1441 remained green until the body was sold in 1953.

FLOORS

The floors of all passenger cars were of oak. Car 1360 was equipped with a mastic floor (a cement-like compound over the wood) on November 30, 1932. About the same time, as an experiment, car 1614 was given a mastic floor except for its front platform; this added 2,000 pounds to the weight of the car and was therefore later removed and not so installed on other cars. The mastic floor was then installed on the rear platform of all cars in service. Later, cars rebuilt for one/two man operation were given mastic floors on the front platform as well. None of the lightweight cars ever received mastic floors. [Light Oak Floor Enamel, 1940's-1950's]

FRONT BULKHEAD DOORS

None: 607-626,Private Car,737-788,797-949.
Single Sliding (to gate side) 2'6" x 6'2": 950-951.
Single Sliding (to gate side) 2'6½" x 6'2": 952-1041.
Single Sliding (to gate side) 2'6 3/4" x 6'1 3/4": 1042-1111.
Single Sliding (to gate side) 2'6¼" x 6'2": 1112-1144.
Single Sliding (to pole side) 2'6 3/4" x 6'1 3/4": 1145-1220,1310-1379.
Single Sliding (to pole side) 2'7" x 6'2¼": 1221-1309.
Single Sliding (to pole side) 2'6 3/4" x 6'2": 1380-1855.

The lightweight cars had no bulkhead doors.

The front bulkheads were rebuilt on cars with front exit doors, a single hinged door was located in a partition which separated the motorman's compartment from the front step passageway.

Both front and rear bulkheads were rebuilt on one/two man operation cars, eliminating all bulkhead doors.

REAR BULKHEAD DOORS

Single Sliding 3'1" x 6'2¼": 737-788,797-867,900-949.
Single Sliding 2'11½" x 6'1 3/4": 868-899.

Double Sliding 3'10" x 6'2": 950-1041.
Double Sliding 3'10" x 6'1 3/4": 1042-1111.
Double Sliding 3'10" x 6'1½": 1112-1144.
Double Sliding 4'4" x 6'2½": 1145-1220.
Double Sliding 4'4¼" x 6'2¼": 1221-1309.
Double Sliding 4'4½" x 6'1 3/4": 1310-1379.
Double Sliding 4'7¼" x 6'2": 1380-1485.
Double Sliding 4'7½" x 6'2½": 1482-1855.

These double sliding doors were retained on all cars rebuilt with front-exit doors.

Cars rebuilt for one/two man operation had both front and rear bulkheads rebuilt, eliminating all bulkhead doors.

HEATERS

Hot water heaters on the first cars built, 737-788 (and 797?), were located in the carbody. See the photograph of 777 on page 247. Beginning in February 1901 these heaters were relocated to the front platform in the motorman's cab.

Hot Water Heaters located on the front platform, in the motorman's cab:
   Baker: 737-1290.
   Peter Smith: 1291-1685.
   Twin City: 1686-1855,2000-2001.
Extra coal was kept in several buckets in the motorman's cab, replenished from coal boxes located at the wyes at the ends of lines.

The first hot air heater exhausting through the rear roof-mounted smoke jack was installed on experimental front-exit car 1788 February-March 1917. TCRT-manufactured hot air heaters were installed on all cars rebuilt with front-exit doors from 1920 through 1924. The heater was located under the car floor at the center of the car on the "gate side". Ductwork ran along both sides of the carbody interior terminating in upright vents behind the first longitudinal seat on each side. Stovepipe and smoke jack were located on the "gate side" at the rear of the car. Extra coal was carried in a hopper beside the heater underneath the car floor. Fires were usually started around November 1st and kept burning constantly all winter until early April. In addition the resistors were placed inside a specially-built cabinet located on the "pole side" of the front platform in the motorman's cab.

Trailers 200-225 were fitted exclusively with Chromolox strip heaters. Cars 2000-2001 were converted to electric heaters and resistor heating. About this time (1921-1924) car 1613 was converted to electric heat: the resistors were placed in the hot air heater and the heat conveyed along the left side of the car.

Lightweight cars 2002-2030 and 1-4 were built with a combination of electric and resistor heating.

The 64 cars rebuilt with front exits in 1928 (1254,1266-1328) were then given electric heating to replace the hot water heater. The resistors were enclosed beneath the car and the heat piped along the "gate side". Electric strip heaters were placed beneath all the seats on the "pole side". Similarily fitted were 1854, the first rebuilt one/two man car in 1931; and rebuilt one/two man cars for the "Jackson St." line, 1124-1128,1131, along with rebuilt double-end car 1129, all in 1932.

In 1931 automatic thermostatic control equipment was purchased and installed for the electric heaters of 100 cars: 2-4,1254,1266-1328,1613,1854 and 2000-2030. These were discontinued in the late 1930's and removed in 1942.

The underfloor hot air heaters were retained or newly installed on all cars rebuilt for one/two man operation not electrically heated. In these cars electric strip heaters were installed on both platforms.

Two cars operating out of Snelling Station were equipped with oil burners in 1946. A valve in the oil line was placed in the front platform where the motorman could adjust it without leaving the car's controls.

PCC cars were heated chiefly by rheostat heat with some auxiliary electric heat. Thermostats were set for 55 degrees.

SEATING ARRANGEMENTS
(Front to Rear)

X signifies cross (transverse) seats. = signifies longitudinal benches.

1. Local cars as built: seven rows X seats + two = benches seating 10 each; total 48.

2. Cars 868-899 had six rows X seats + two = benches seating 8 each; total 40.

3. Suburban cars plus Sightseeing cars 938-951:
   Thirteen rows X seats, with single seats in the last row; total 50.
   One single seat was removed (total now 49):
      for P.A.Y.E. winter local service;
      eight cars retained for Mahtomedi line after 1932 (1116,1117,1119,1257,1260-1263);
      four cars retained for Inter-Campus line after 1932 (1146-1149).

737-788 originally built with all X seats (single in last row). also 900-949

800 series cars (and 992-993?) rebuilt Dbl End had all = benches

4. Car 1450 built 1911 with front-exit sliding door had the same 50 seat arrangement as the Suburban cars.

5. Cars rebuilt with front-exit doors from 1920-1924: three rows of X seats removed and replaced by = benches seating 5 each; total 46. This provided more standing room at the front exit.

6. Trailers 200-225: all = benches with a circular bench around the front platform; total 57. In 1930 ten trailers (200-208,210) for permanent trains received seven rows X seats arranged similarly to those in the 1928 rebuilt front-exit cars.

7. 2000-2000A built 1916:
   2000: Local arrangement with = benches at the rear; total 47.
   2000A: Local arrangement with = benches at the front plus a circular bench around the rear platform; total 54.
   Eventually both cars were re-arranged to conform with 2004-2030.

8. 2002-2003 built 1921:
   2002: five rows X seats in center plus = benches front and rear (longer than on 1928 rebuilt front-exit cars; total 48.

2003: five rows X seats in center plus = benches front and rear plus circular bench around the front platform; total 57.
Eventually both cars were re-arranged to conform with 2004-2030.

9. 1-4 built 1925: six rows X seats in center, three-seat = benches front and rear; total 36. Increased to 42 total with circular bench around rear platform.

10. Front-exit cars 1254,1266-1328 rebuilt 1928: seven rows X seats in center plus five-seat longitudinal benches front and rear; total 48.

11. All 526 previously-rebuilt front-exit cars were then changed to conform with 1254,1266-1328.

12. This 1928 seating arrangement was retained for all cars rebuilt for one/two man operation. ON front-exit cars and one/two man cars with hot air heaters the seating capacity was actually 47 as the stove pipe displaced the last rear "gate side" bench seating position.

13. Cars 2004-2030 built 1926-1927: same seating arrangement as on 1254,1266-1328 plus a single seat facing the aisle on the "pole side" of the front platform behind the motorman; total 49.

14. Double-end cars 1129 and 1230: same seating arrangement as on 1254,1266-1328 except reversible X seats on 1129. (On 1129 I had another note: five rows X seats plus = benches front and rear.)

15. Double-end car 3: rear platform circular bench removed; total 36. All X seats reversible.

16. Double-end car 4: all = benches; total 36.

All seats were covered with natural-color rattan. In later years the rattan was painted yellow (rattan seat enamel). In an effort to reduce the expense of maintaining the rattan seats dark green pantasote seats with the same weave as the rattan seats were installed 1-21-1944 on car 1615 and subsequently on cars 1408,1454,1485,1492,1501,1577,1587,1618,1656,1669,1707 and 1747. From 1947 onward dark green Koroseal seats as used on the PCC cars were placed in more than 60 rehabilitated one/two man cars.

PCC cars

17. 299 came with the Pittsburgh arrangement and brown leather seats.
"Pole side": 18 single X seats + five double X seats; "Gate side": 12 single X seats + five double X seats; Rear: five-passenger X seat; total 55.
The conductor had to stand at first, with the fare box suspended from the post by the center doors. He was later given a fixed seat opposite the center doors, reducing the total to 53.

18. 300-339 two-man cars, green leather seats.
"Pole side": 15 double X seats; "Gate side": six single X seats + six double X seats; Rear: five-passenger X seat; total 53. On the "pole side" a center seat, eighth from the rear, was displaced by the conductor's position; his seat, when not in use, was raised against the seat back by a spring so passengers could not take it when he was standing. On the "gate side" the six single X seats and one double X seat were located forward of the center doors.

19. 340-439 one man cars: green Koroseal seats (390-439 leather-grain).
Same seating arrangement as on 300-339 except the conductor's position was replaced by one double X seat; total 55. Sixteen double X seats on the "pole side".

INTERIOR LIGHTING

The older standard cars had 36-watt Mazda bulbs. According to the 1-1-1916 Valuation Report typical car specifications, the total bulbs were 18, 19 or 20. Eighteen bulbs: typical cars 737,878,986,1105 and 1131. Nineteen bulbs: typical car 1145. Twenty bulbs: typical cars 1211, 1279,1415 and 1579.

Front-exit cars had four series of lights: two series of five lights each along each side of the car (one individual light for each double seat); one series of five lights, two on each of the side destination signs and one above the front steps; and one series of five lights, two on the front destination sign, one above the farebox, and two on the rear platform. These cars had 94-watt headlights and 8-watt tail lights.

Lightweight cars had 23-watt bulbs of clear glass in the carbody and destination sign boxes, and 72 watt headlights. Those bulbs in the carbody were enclosed in ornamental glass boxes.

One/two man cars rebuilt during 1932 and subsequent years had nine 56-watt lights inside and a 56-watt headlight. Earlier rebuilt cars were changed to conform to this pattern; December 1934 Authorization #6464: change lights from old 23-watt "gatecar" arrangement in 36 cars 1293-1326,1328,1854. 1327 was the first car to have the type one/two man car light arrangement. Later, Holophane shade reflectors and shade holders were placed on all these bulbs.

Lightweight cars rebuilt during 1932 were equipped with ten 56-watt bulbs: one in the headlight, one in the front destination sign box, seven inside the car and one on the rear platform. Holophane shade reflectors and holders replaced the original ornamental boxes.

In 1937 the standard one/two man car lighting arrangement was again changed; 534 cars were changed by 1939. 56-watt bulbs were connected in two series of four lights each, alternate bulbs in opposite series. These two series connected with a 94-watt headlight which dimmed if either series went out. An additional circuit of five 15-watt bulbs was installed: one at the farebox, on in the tail light, and three in the front ENTER HERE signbox. At this time the Holophane light shades were removed.

REAR END CONTROLS

Authorization #6914 dated 9-8-1936 provided for installation of these controls for backing the car from rear platform in 562 one/two man cars, after experimental work had been performed with car 1324. 560 cars were actually completed by December 1937; two cars, 1610 and 1629, had been involved in a collision before this work could be done.

FARE REGISTERS

The Mech. Dept. record cards provide very little information. Apparently International Double Registers were the most prevalent. Ohmer Registers were noted on cars 1145-1149,1161-1162.

Johnson Fare Boxes were used exclusively.

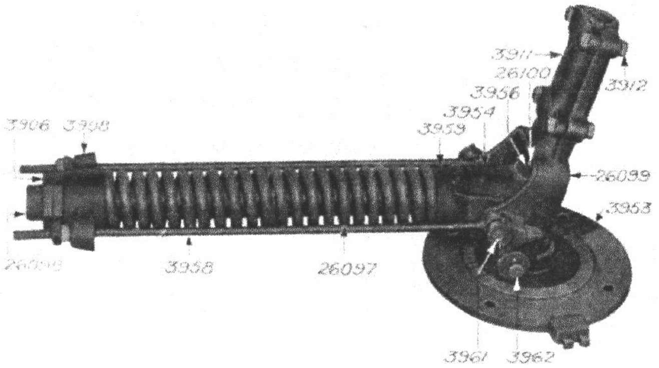
PASSENGER SIGNALS

Electric push-buttons were wired to a battery-operated doorbell. There were 28 push-bottons on most front-exit cars, one button on each window post, and four on the rear platform. On one/two man cars the four rear-platform push-buttons were connected to a buzzer; this enabled the motorman to open the rear doors instead of or in addition to the front doors as necessary.

UNION STANDARD TROLLEY BASES

*No. 6 TROLLEY BASE

Approximate Weight, 82 lbs.



*The maximum length of pole to allow of successful operation of this base is 13 feet. If longer pole is desired, the General Electric Company must decline the responsibility for the successful operation of the trolley. Poles 1½ in. diameter at base.

By adjusting the compression spring the pressure on the trolley wire may be varied from 10 to 30 lbs. with a 12 ft. pole, standard harp and Form 6 wheel at an angle of 45 degrees.

Cat. No.	Description
3934	Trolley Base, without pole
3953	Stand or foot, with terminal binding screws
3954	Swivel with brass bushing
26096	Brass bushing for swivel
26097	Compression spring, (2 required)
26098	Spring guide
3906	Nut for spring guide, (2 required)
3958	Side rod with nuts, (2 required)
3961	Side rod pin with cotter, (2 required)
3960	Pole socket, complete
26099	Pole socket body
3911	Pole socket clamp
3912	Bolt and nut for clamp, (4 required)
3962	Pole socket axle pin with cotters
3956	Brass washer for stand or foot
26100	Cap screw for stand or foot
3959	Buffer
3908	End yoke

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UNION STANDARD TROLLEY BASES

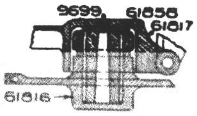
*No. 13 TROLLEY BASE—ROLLER BEARING

Approximate Weight, 115 lbs.

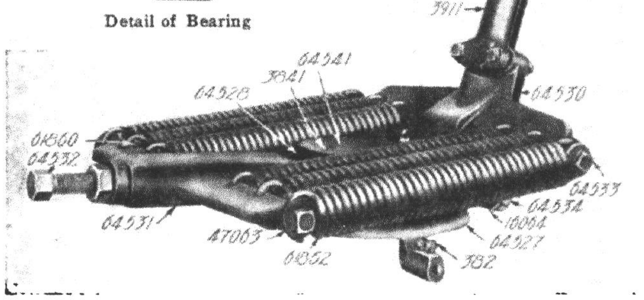
The U. S. 13 Base is of the roller bearing type. Its bearing consists of 34 tool steel rollers carried in a bearing cup so constructed as to be both water and dust proof and to form a retaining well for the lubricating oil. This method of construction gives a constant and uniform lubrication of the rollers, the oil being retained indefinitely. The oil inlet is located at the top of the bearing cap and is readily accessible.

The center stud of the base rests firmly on the stationary base, thus ensuring good electrical contact.

A cushioned stop has been provided to minimize the possibility of mechanical injury should the trolley wheel leave the wire.



Detail of Bearing



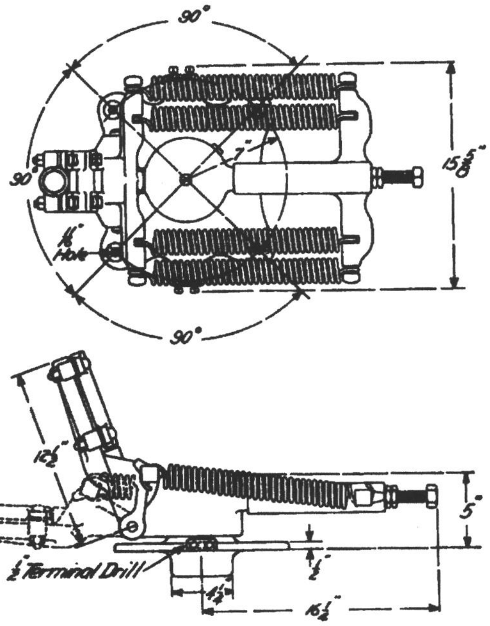
U. S. No. 13 Roller Bearing Trolley Base

Four extra heavy tension springs are used and the spring retaining bolts, held by small cotter pins, are easily removed should a replacement of a spring become necessary. A heavily ribbed adjusting arm and slide, operated by a single adjusting screw, **gives a range of pressure of from 20 to 45 pounds at the wire. The overall height of the base is 5 in.**

The U. S. 13 Base, designed primarily for high speed interurban service, is equally efficient for local traffic. It not only permits taking sharp turns at high speed but by largely eliminating arcing, pounding, wrenching, etc., greatly increases the life of trolley wheels.

*The maximum length of pole to allow successful operation of the U. S. 13 Trolley Base is 14 feet. If a longer pole is used, the General Electric Company will not guarantee the successful operation of the trolley. Pole 1½ in. diameter at base.

DIMENSIONS



Cat. No.	Description
58970	U. S. No. 13A roller bearing trolley base, complete without pole
61816	Bearing base with terminal binding screws
61817	Bearing cap
61818	Pole socket, complete, without buffer spring
61819	Pole socket body
3911	Pole socket clamp
61850	Pole socket axle pin
3912	Bolt and nut for pole socket clamp, (4 required)
61851	Spring adjusting bracket
61852	Tension spring, (4 required)
61853	Buffer spring
61854	Spring holder bolt, (4 required)
61855	Bolt and nut for buffer
61856	Adjusting screw and nut
1869	Terminal binding screw for base, (4 required)
61857	Retaining screw with nut No. 16009, for bearing cap
9699	Screw for bearing cap
61858	Roller, (34 required)
61859	Washer for buffer bolt
16064	Cotter pin, 3/16" x 1¼", (7 required)
61860	Cotter pin, 3/16" x 1⅜", (5 required)

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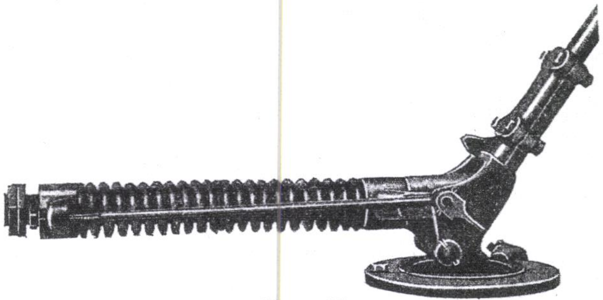


FIG. 4873.
U. S.-6. TROLLEY BASE.
GENERAL ELECTRIC CO.

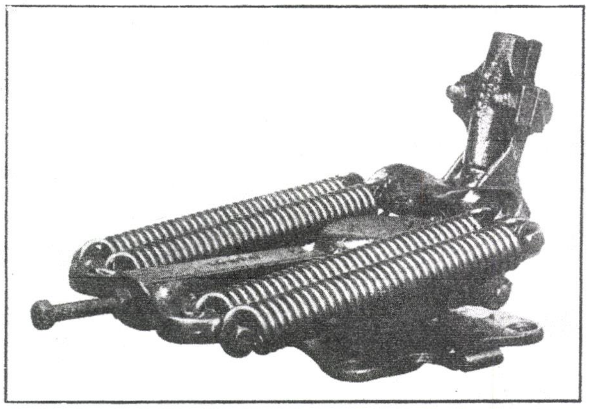
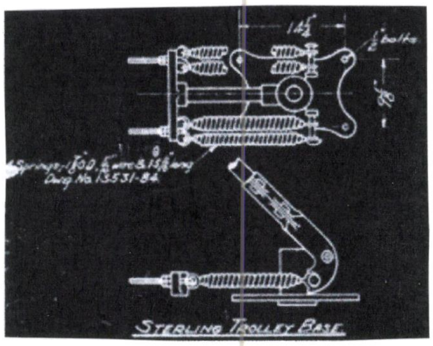


Fig. 2612—U. S. 13 Form D Trolley Base. General Electric Company.



STERLING TROLLEY BASE

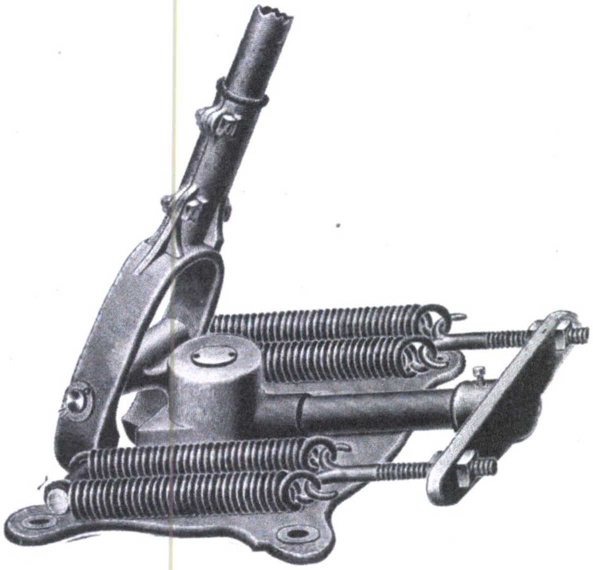
ETW 11-28-1908

USING A 7-IN TROLLEY WHEEL

The Twin City Rapid Transit Company makes its own trolley wheels. It uses a large but comparatively light wheel. The hub or bushing has been lengthened to 3 ins., and the wheel is 7 ins. in diameter in the groove. It has been found a large diameter wheel not only gives longer wear but does away with much of the rumbling noise which is annoying to passengers inside the cars.

The trolley wheels are made from the following composition:

93½ per cent copper.
6 per cent tin.
½ per cent phosphorus.



The Sterling Trolley Base No. 3.

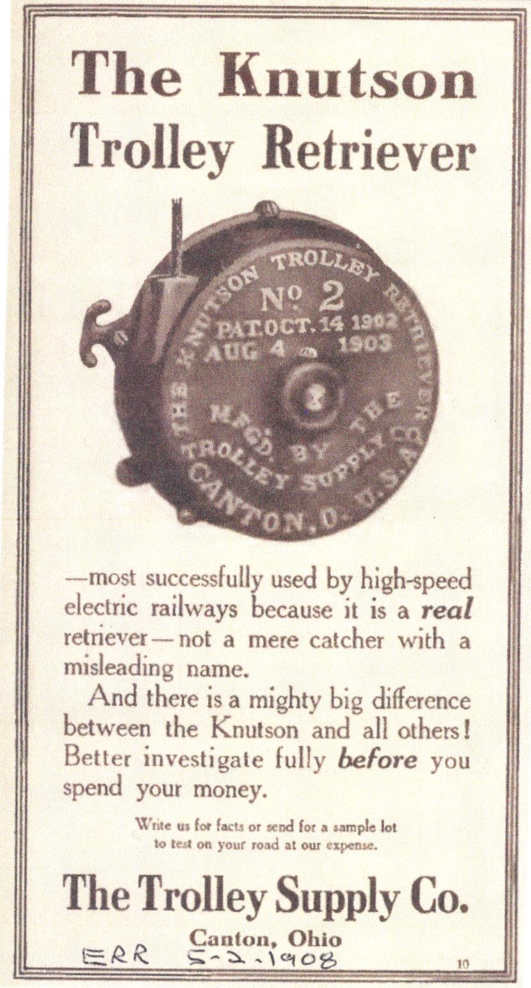
Combines great strength with compact form.
Perfect action on curves.
Any tension desired.
Uuequaled durability.
One set of roller bearings.
Not subject to freaks.
Surest and most economical.

ASK FOR REFERENCES, PRICES AND SAMPLES.

Sterling-Meaker Co., Newark, N. J., U. S. A.

See pages, 246 and 247

SRJ 1904



The Knutson Trolley Retriever

THE KNUTSON TROLLEY RETRIEVER
No 2
PAT. OCT. 14 1902
AUG 4 1903
MFGD. BY THE
TROLLEY SUPPLY CO.
CANTON, O. U.S.A.

—most successfully used by high-speed electric railways because it is a *real* retriever—not a mere catcher with a misleading name.

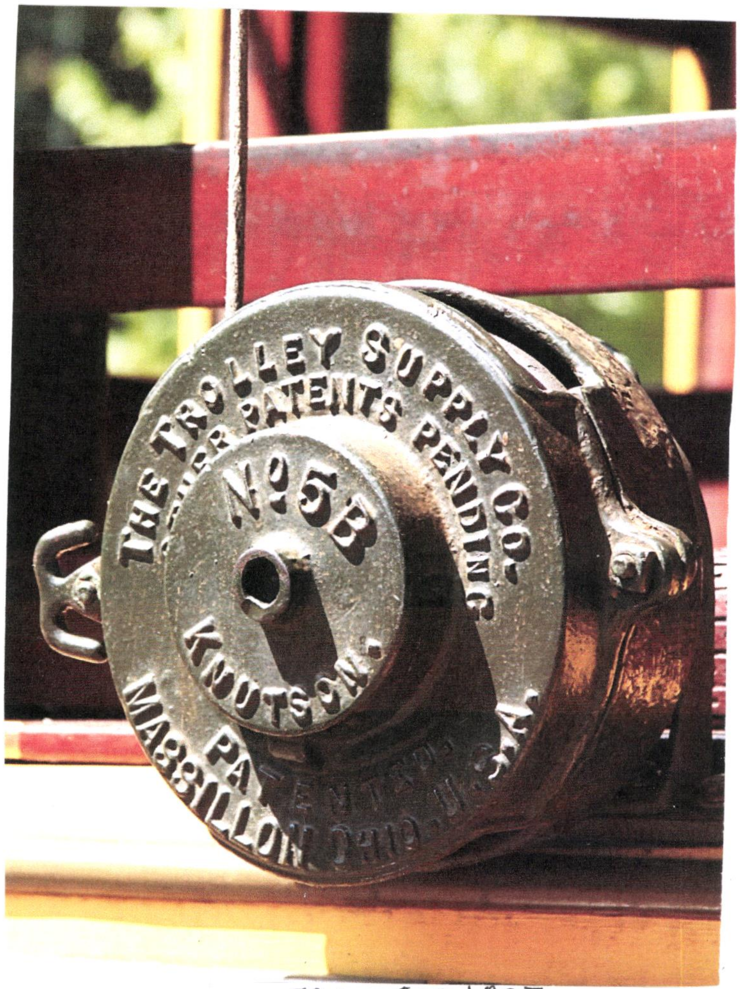
And there is a mighty big difference between the Knutson and all others! Better investigate fully *before* you spend your money.

Write us for facts or send for a sample lot to test on your road at our expense.

The Trolley Supply Co.

Canton, Ohio

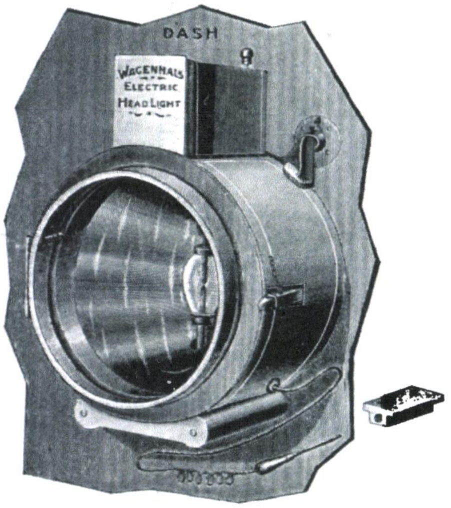
ERR 5-2-1908



SRJ Oct 1897

Arc Electric Headlight for Electric Cars.

The headlight problem is an important one in electric railway operation, especially for high speed cars, as where the cars operate over city streets there is much more likelihood of collision with vehicles and pedestrians than in steam raillroad service. It is natural to assume therefore that a much stronger headlight should be used than even on steam railroads. The arc light promptly suggests itself for this purpose, but the difficulties which have heretofore been experienced in the connection of an arc light on a railway circuit have prevented its adoption. These difficulties, it is claimed, have now been overcome in the Wagenhals electric arc headlight built by the Dayton Manufacturing Company. It is the only headlight of its class in successful operation to-day, and was invented by a practical interurban manager who has found that a headlight giving more light than the best forms of oil headlight is most desirable. The headlight, which is shown in the engraving, throws its rays one-quarter to one-half mile ahead, giving the motorman time to stop his car no matter at what speed he is running, two or three times, before striking any obstruction which may be on the track.



ELECTRIC ARC HEADLIGHT.

The argument has sometimes been advanced that on account of its brightness a headlight of this character would frighten horses along a crowded highway. This has been found not to be the case, as a horse facing the light does not see the car, and there are few horses that have not seen an ordinary street arc light. To operate the lamp after it is hung in the dash castings, all that is required of the motorman is to make connection with the circuit by inserting a connecting plug into a receptacle under the platform of the car, touch the button on the top of the headlight, and the lamp is good for two hours' run without any attention. If the circuit breaker at the station should open, extinguishing the arc, the only attention required by the lamp is for the motorman to touch the button, which will start the arc. The Wagenhals lamp will burn on a consumption of from 3 amps. to 4 amps., giving between 3000 c. p. to 5000 c. p. The voltage is reduced through German silver resistance substantially built of porcelain with an iron case, which can be hung under the car out of the way, and requires no attention whatever as it will give a uniform amperage under all conditions. The lamp is in use on all the cars of the Dayton Traction Company, and is giving good satisfaction.

* * *

3-15-1899

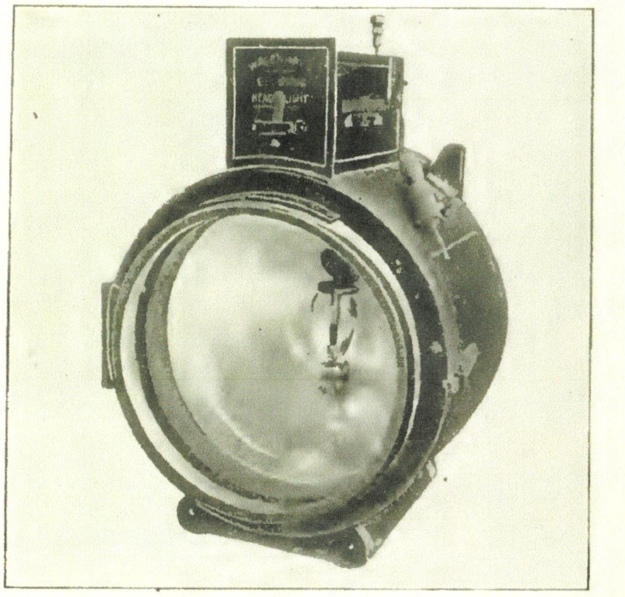


FIG. 3 WAGENHALS HEADLIGHT.

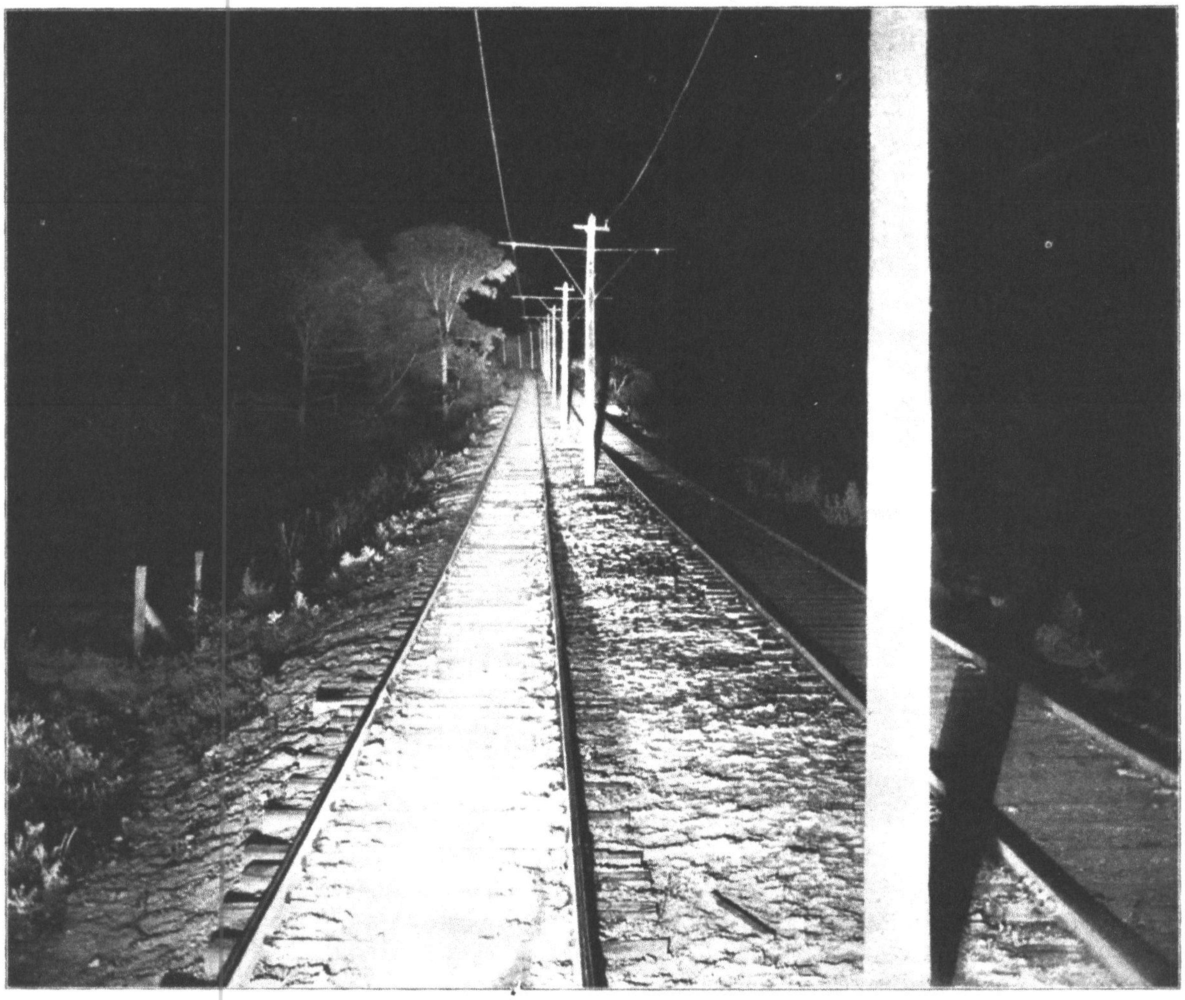
1904

The Dayton Manufacturing Company

DAYTON, OHIO, U. S. A.

MANUFACTURERS OF CAR TRIMMINGS, LAMPS, ELECTRIC FIXTURES, ETC., FOR STEAM, STREET AND INTERURBAN RAILROAD CARS.

Kling-Leen & Gravity Brake Handles, Water and Dry Closets. Silvey Storage Batteries. Avery's Acetylene Car Lighting System.



THE ABOVE SCENE IS FROM A PHOTOGRAPH TAKEN AT NIGHT ON THE ROAD OF THE CINCINNATI, DAYTON & TOLEDO TRACTION COMPANY BY THE LIGHT OF A WAGENHALS (ARC) HEAD LIGHT.

SELLING AGENT FOR

Eureka, Wagenhals, Mosher, Rex and Wellman (Arc) Head Lights and Many Styles of Incandescent Head Lights

WRITE US FOR CATALOGUE AND PRICES

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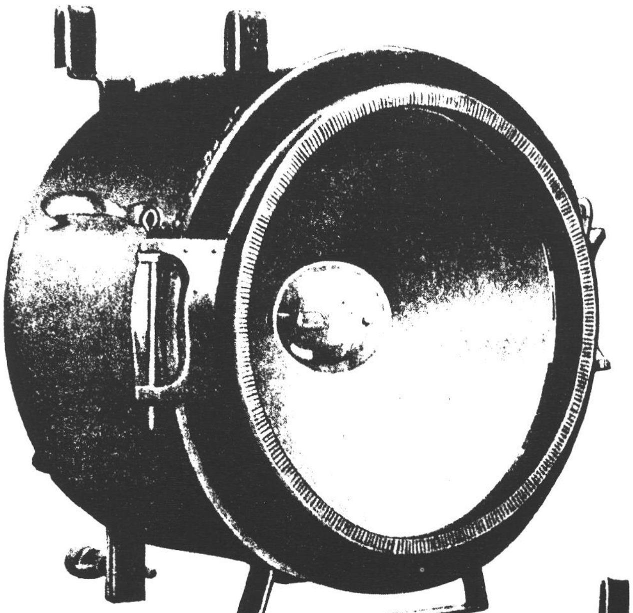
The Dayton Manufacturing Company

Headlights

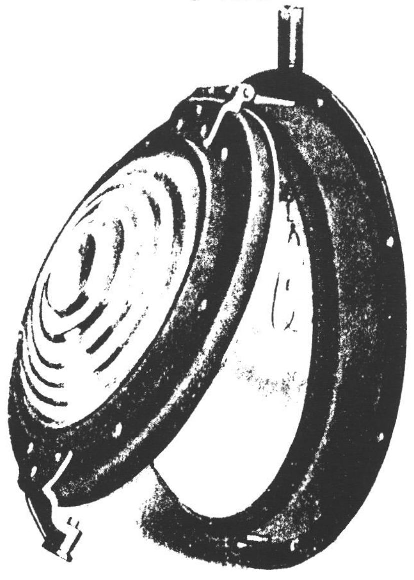
No. 1683, Incandescent

With 12 inch Glass "Golden Ray" Reflector.
For Interurban Cars.



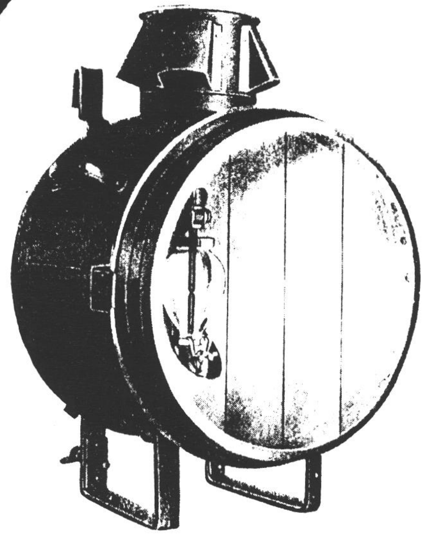
No. 1583-A Pressed Steel

With 8⅜-inch Semaphore Lens and
Enameled Reflector Body.
For City Cars.



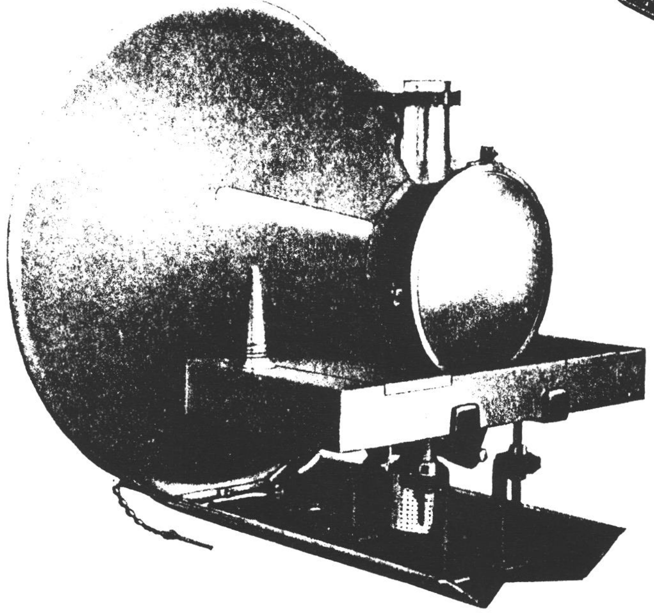
No. 1477
"Mosher" Arc

For Interurban Cars.
10, 12, 14 and 16 inch.



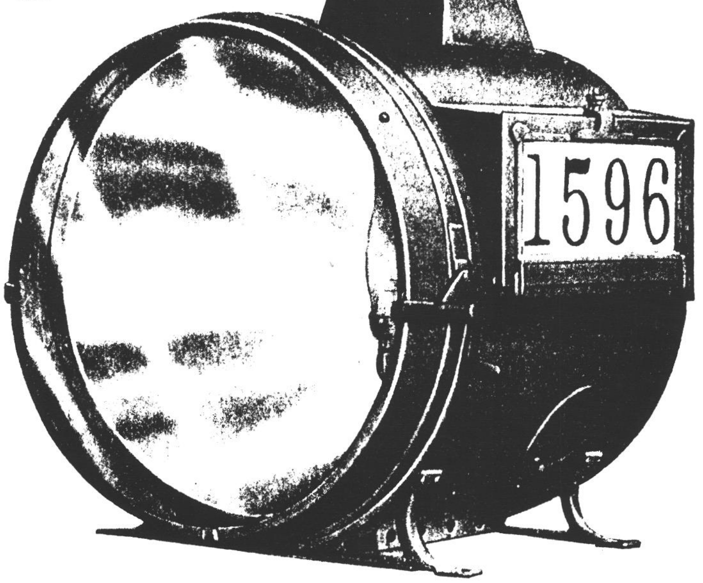
No. 1596-D Locomotive Oil Headlight

Interior View Showing Removable Glass
Mirror Reflector.



No. 1596-D
Locomotive Oil Headlight

With 8 inch Silvered Glass Mirror
Reflector and 23 inch Silver-Plated
Copper Parabolic Reflector.

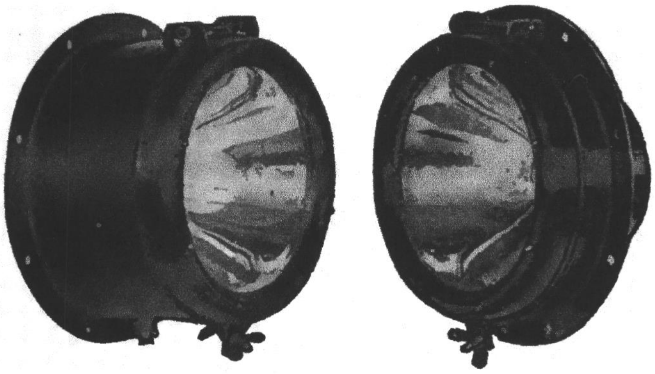


NOTE: We make nearly 1700 different styles of headlights, suitable for any service. Only a few representative types are shown herein. Special catalogs will be mailed on request.

"Golden Glow" Headlights

with the Famous "Golden Glow" Mirror Reflectors
They Penetrate Fog

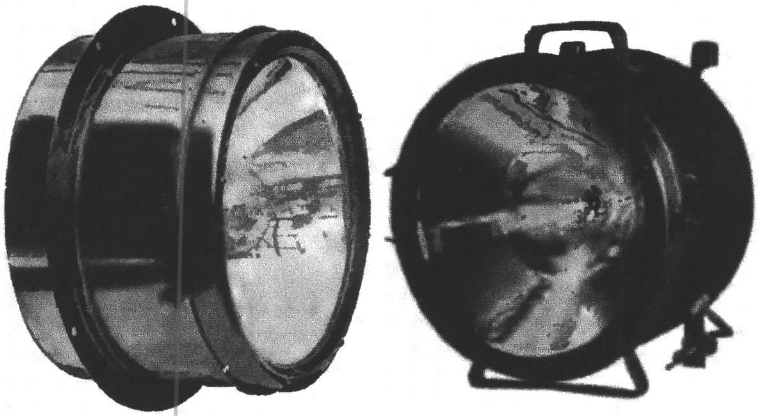
"Golden Glow"
for
City Service



"Golden Glow" Headlights are equipped with the famous "Golden Glow" mirror reflectors. Each reflector is moulded from special glass, ground to a true parabola, polished to a mirror finish and silvered as would be the finest French plate glass mirror. "Golden Glow" mirrors cannot be equalled and cannot be duplicated by any other manufacturer, because the machinery for doing this is special and patented.

The glass used in "Golden Glow" reflectors has a rich golden-green color which absorbs the ultra-violet, violet and other high frequency rays, thus projecting a beam of golden-yellow light which is non-blinding and wonderfully adapted to the penetration of fog, moisture and dust.

"Golden Glow" Headlights for city service are far superior to any other headlight to be had on account of the greater volume of light projected, their economy and their non-blinding features. This also applies to those for interurban service, which may be operated at a cost insignificant as compared with arc headlights.



"Golden Glow"
For
Interurban
Service

Allow us to Demonstrate a "Golden Glow" on your Cars

Electric Service Supplies Co.

Manufacturer of Railway Material and Electrical Supplies

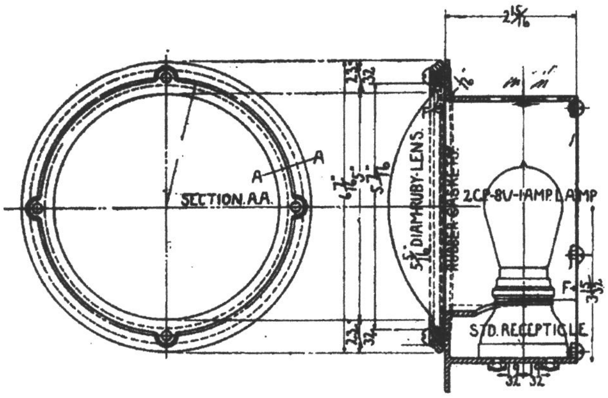
PHILADELPHIA
17th and Cambria Sts.

NEW YORK
50 Church Street

CHICAGO
Monadnock Bldg.

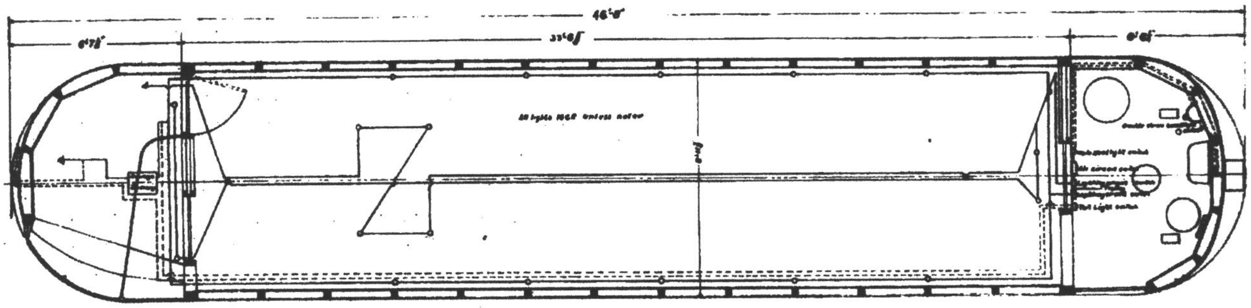
SAFETY TAIL LIGHT 9-19-08

The new cars now under construction by the Twin City Rapid Transit Company, described in ELECTRIC TRACTION WEEKLY issue of September 12, 1908, will be equipped with a safety incandescent tail light, which will show a red light to the rear of the car, even if the trolley wheel leaves the wire and the car lights are extinguished. The arrangement consists of a regulation Lintern battery in parallel with the tail light, and both in series with the interior lamps. Normally the tail light receives its current from the trolley circuit, but in the event that the trolley leaves the wire, the storage battery automatically delivers current to the tail lamp and will keep it burning for ten hours. Then when the trolley circuit is restored the battery automatically recharges, ready for the next emergency. The diagram shows the wiring circuits as applied to the Minneapolis car.



Details of Safety Tail Light

The tail light is set in the center of the rear dash. The lamp is a 2-c. p., 8-volt, 1-amp. incandescent, housed in a malleable iron receptacle. The bulls-eye ruby lens is 5 5/16 ins. in diameter. The details of the arrangement are shown in the sketch.



Wiring Circuits for Lamps, Storage Battery and Tail Light

◆◆◆

ADAMS & WESTLAKE CO.

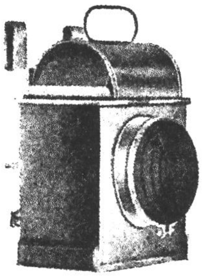


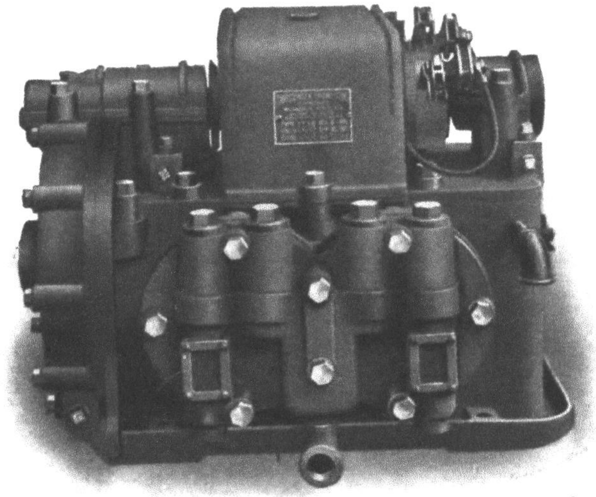
Fig. 1087—Square Body Tin Tail Lamp, No. 19

1904

Christensen Air Brake Equipments

Solve the Problem

of operating Electric Cars at high speeds with perfect safet



The most compact, efficient and economical compressor on the ma
They will run for years without undue wear.

See our Exhibits, Louisiana Purchase Exposition.

National Electric Company

Successor to Christensen Engineering Co.
General Sales Office and Works,
MILWAUKEE.

NEW YORK: 135 Broadway.
PHILADELPHIA: 1509 Land Title Bldg.
CHICAGO: Old Colony Bldg.
CLEVELAND: 812 Prospect St.
SAN FRANCISCO: S. I. Wailes 519 Mission St.
R. W. BLACKWELL & CO., London, Brussels and Paris.
EDGE & EDGE, Sydney, Aus.

Christensen Air Brakes

Are now in use on more than 95% of all electric railways that have adopted either air or electric brakes.

The compact design, accurate construction and superior performance of our independent motor-driven air compressor are some of the causes that have led to the installation of over 5,000 of these equipments on

More than 225

Electric Railroads throughout the world.

hristensen Engineering Co.

MILWAUKEE, U. S. A.
NEW YORK OFFICE: 135 BROADWAY

1902

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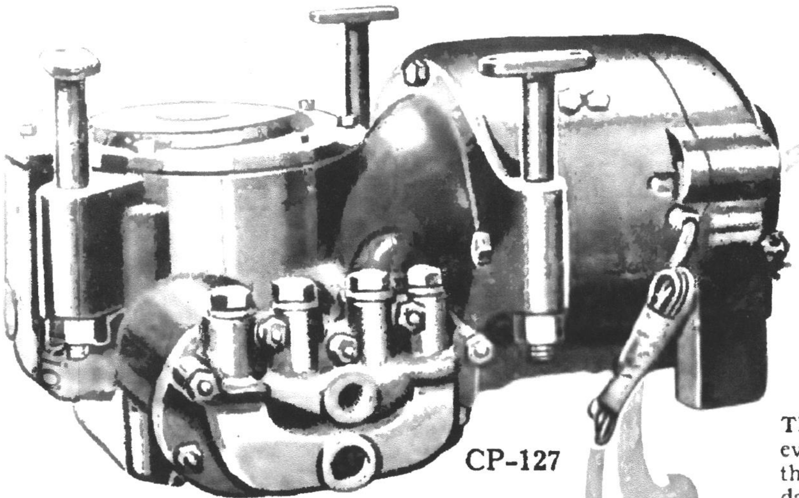
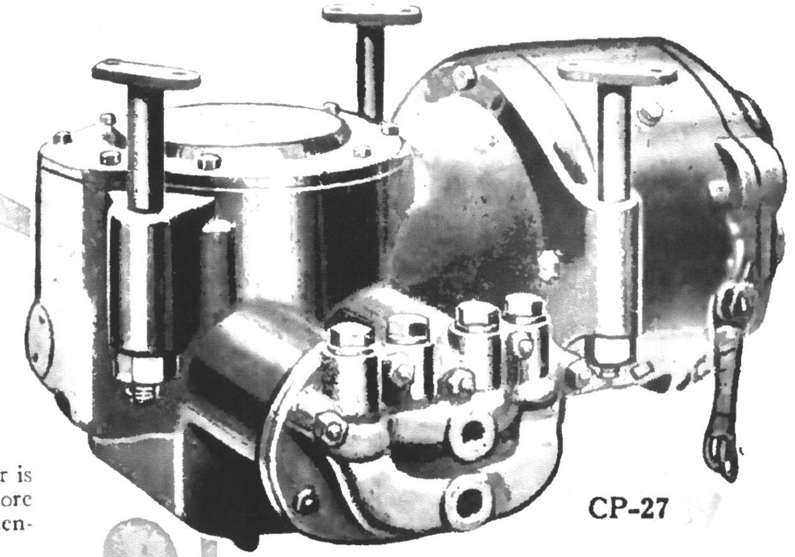
Type CP—*the Low-Maintenance Compressor*



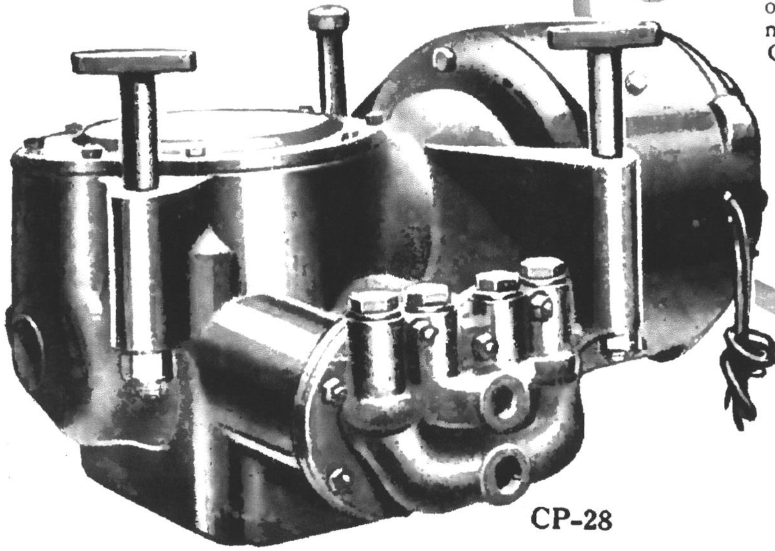
CP-127



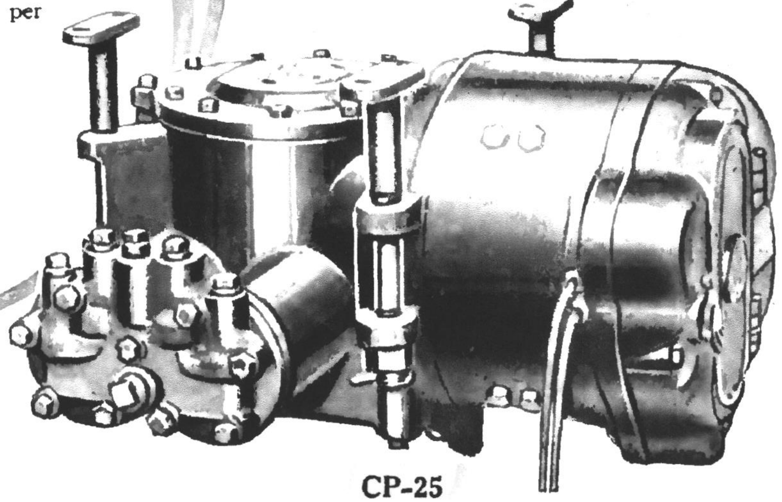
CP-27

The popularity of the CP Compressor is evidenced by recent repeat orders for more than 750 new units, – the best recommendation for any equipment.

The CP line includes designs for any class of service, city or interurban. And the maintenance cost averages only $3 per Compressor per year.



CP-28



CP-25

General Electric Company

General Office

Sales Offices in
all large cities

25-173

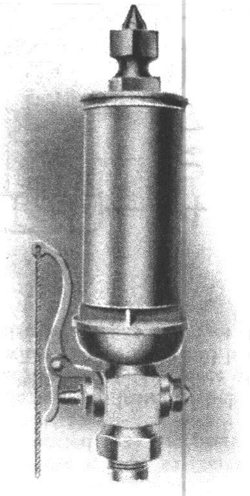


FIG. 50. Standard Whistle Outfit

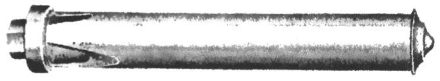
AUG 1906

DEEP-TONED AIR WHISTLES FOR INTERURBAN CARS.

Some little annoyance has been caused both passengers and dwellers in suburban towns by the shrill sound of the ordinary air whistle used on interurban cars. To do away with this annoyance a new whistle designed on the same principle as an organ pipe has recently been placed on the market by the General Electric Company.

In the past air whistles have been designed along the same lines as steam-blown whistles. It is generally known that steam whistles operated by air give a very different tone when operated by steam. This is due in part to the condensation of the steam and the resulting increase in its density as it issues from a restricted orifice. This condition will not obtain with air so that the tone of an air-blown steam whistle is harsh and shrill.

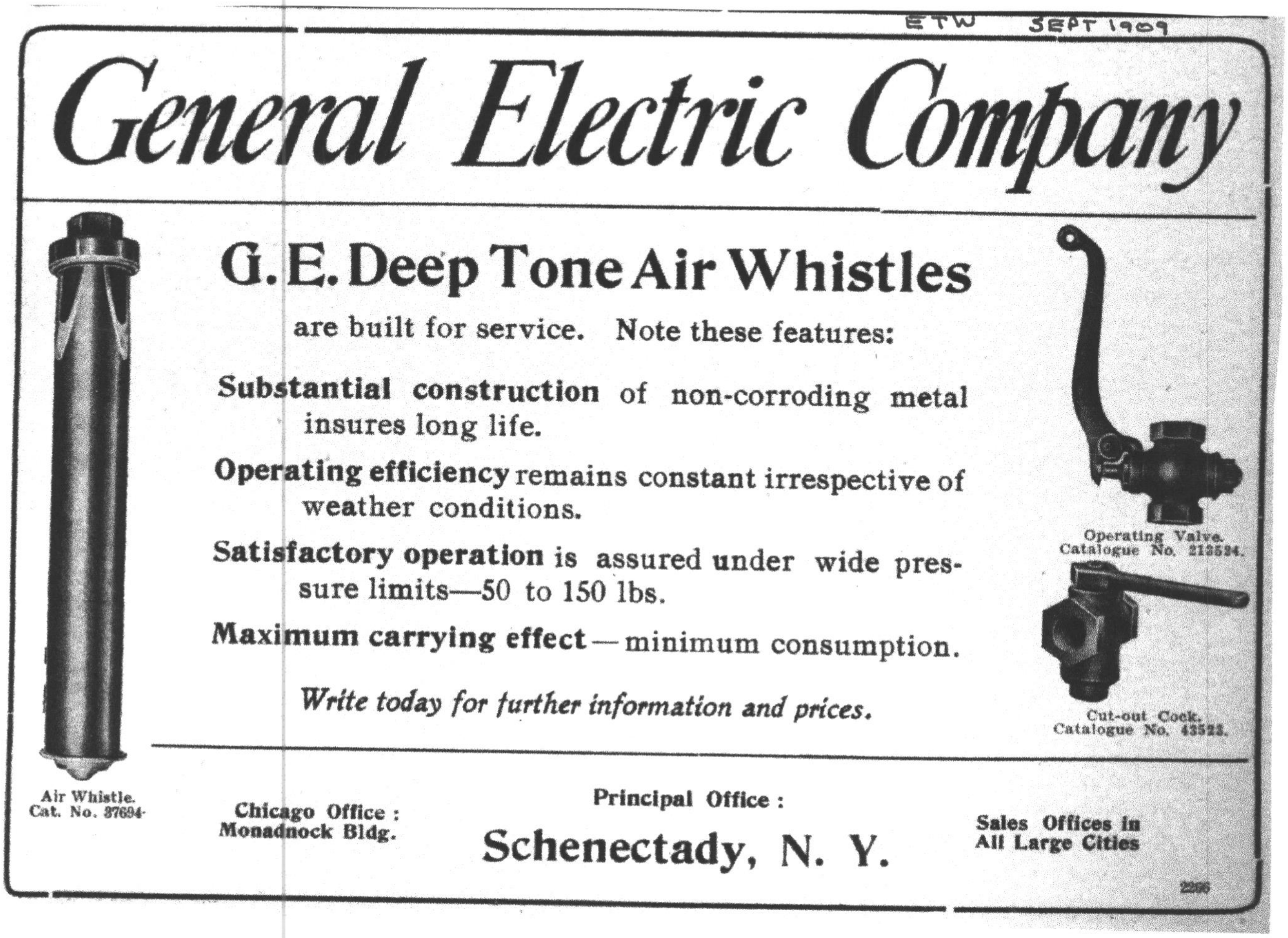
The organ type of whistle meets the requirements of air operation in a very satisfactory manner, provided the whistle is protected from outside atmospheric disturbances such as a high head wind. The whistle shown in the illustration is designed with center partitions, so located as to prevent a transverse flow of air across the ports, which would tend to distort the effective air column. The sound emitted by this whistle is deep and clear in tone and sufficiently penetrating to be heard at a considerable distance.



Deep-Toned Air Whistle.

The whistle is substantially constructed of non-corroding metal and should last indefinitely. The standard whistle operates most effectively at an average air pressure of 55 pounds per square inch. It operates satisfactorily, however, at pressures varying from 50 to 130 pounds per square inch. A convenient operating valve of the adjustable lever type is provided with this whistle.

ETW SEPT 1909



General Electric Company

G. E. Deep Tone Air Whistles

are built for service. Note these features:

Substantial construction of non-corroding metal insures long life.

Operating efficiency remains constant irrespective of weather conditions.

Satisfactory operation is assured under wide pressure limits—50 to 150 lbs.

Maximum carrying effect — minimum consumption.

Write today for further information and prices.

Air Whistle.
Cat. No. 37694.

Operating Valve.
Catalogue No. 213524.

Cut-out Cock.
Catalogue No. 43523.

Chicago Office :
Monadnock Bldg.

Principal Office :
Schenectady, N. Y.

Sales Offices in
All Large Cities

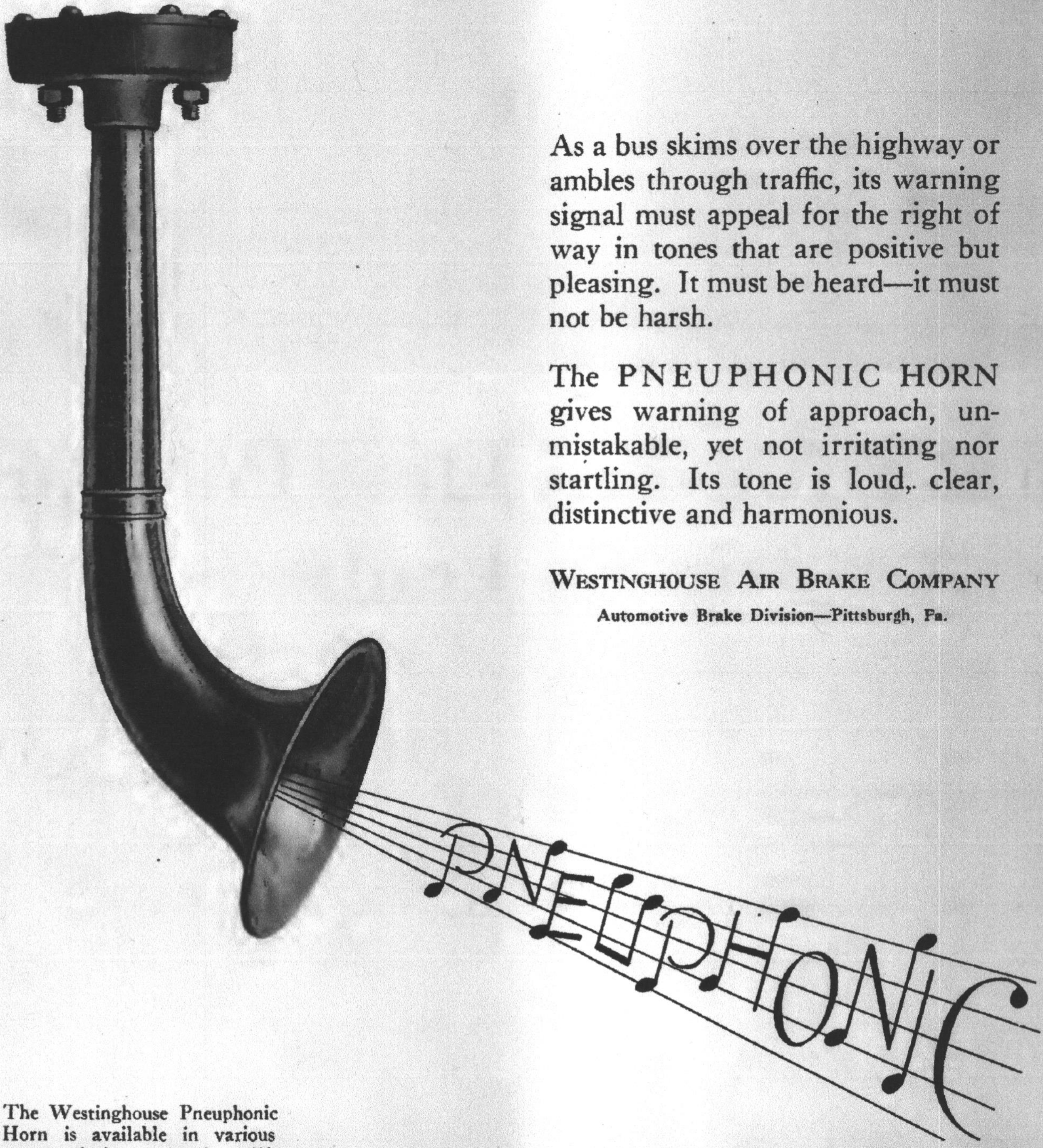
2266

As Harmonious as its name

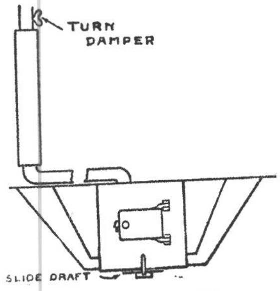
As a bus skims over the highway or ambles through traffic, its warning signal must appeal for the right of way in tones that are positive but pleasing. It must be heard—it must not be harsh.

The PNEUPHONIC HORN gives warning of approach, unmistakable, yet not irritating nor startling. Its tone is loud, clear, distinctive and harmonious.

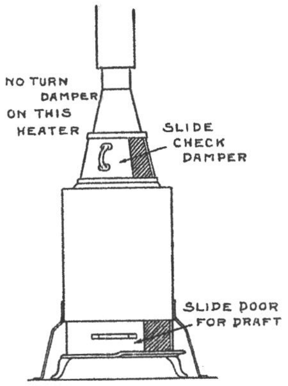
Westinghouse Air Brake Company
Automotive Brake Division—Pittsburgh, Pa.



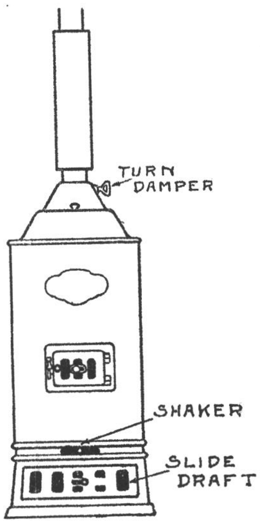
The Westinghouse Pneuphonic Horn is available in various types and sizes to produce different tonal qualities, and in combinations for producing a pleasing chime effect when desired. Write for descriptive literature and prices.


TURN DAMPER
SLIDE DRAFT

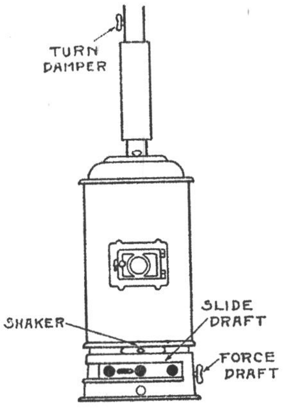
HOT AIR HEATER


NO TURN DAMPER ON THIS HEATER
SLIDE CHECK DAMPER
SLIDE DOOR FOR DRAFT

BAKER HEATER

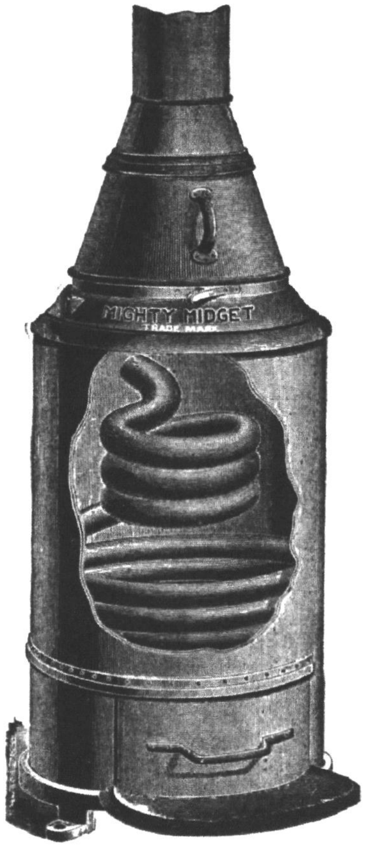

TURN DAMPER
SHAKER
SLIDE DRAFT

PETER SMITH HEATER


TURN DAMPER
SHAKER
SLIDE DRAFT
FORCE DRAFT

TWIN CITY HEATER

ETW 9-25-1909


MIGHTY MIDGET
TRADE MARK

The Mighty Midget

Hot Water Car Heater

Adapted for Large Electric Cars and Long Distance Lines. Exclusively used on Largest Electric Systems. Ask for Catalog.

THE WILLIAM C. BAKER
HEATING & SUPPLY CO.
143 Liberty Street NEW YORK

PETER SMITH HEATER CO.
DETROIT MICH.

ARE WE MAKING GOOD? WE LEAVE IT TO YOU

Here are a few of the roads from whom we have recently received large orders for Type "C" Magazine Heaters:

Indianapolis Traction & Terminal Co., Indianapolis.

Milwaukee Electric Railway & Light Co., Milwaukee.

Twin City Rapid Transit Co., Minneapolis.

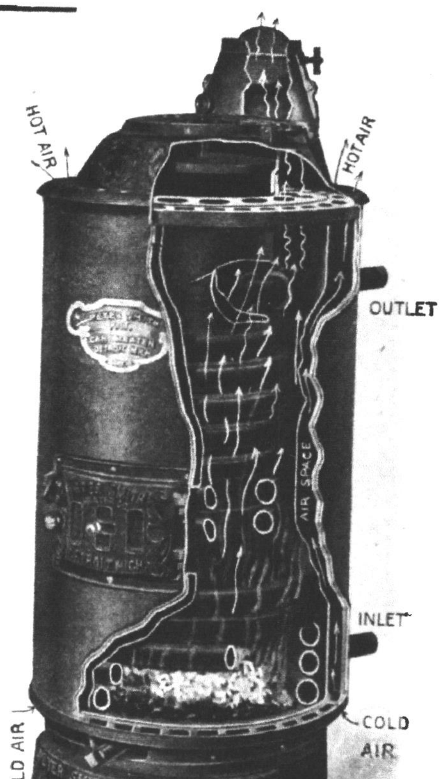
New York State Railways, Rochester.

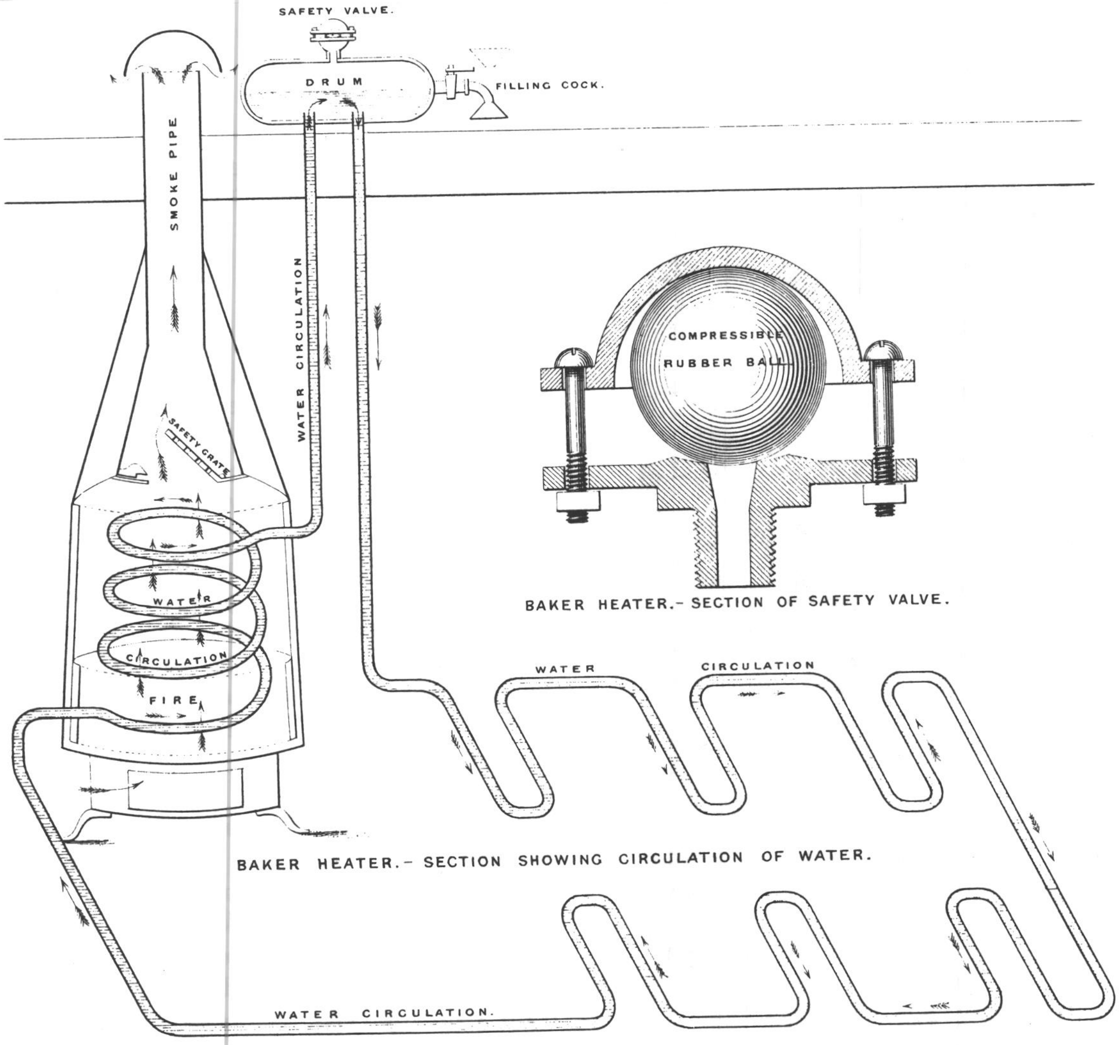
Louisville Railway Co., Louisville.

500 Heaters sold so far this year.

We have 25 years' experience in the Car Heating Business. Nine-tenths of all Hot Water Heaters used in city and interurban, bear our name.

The Peter Smith Heater Co.
DETROIT, MICH.


HOT AIR
HOT AIR
OUTLET
AIR SPACE
INLET
COLD AIR
COLD AIR
PETER SMITH HEATER CO.
DETROIT MICH.


SAFETY VALVE.
DRUM
FILLING COCK.
SMOKE PIPE
WATER CIRCULATION
SAFETY GRATE
WATER
CIRCULATION
FIRE
COMPRESSIBLE
RUBBER BALL
WATER
CIRCULATION
WATER CIRCULATION.

BAKER HEATER.– SECTION OF SAFETY VALVE.

BAKER HEATER.– SECTION SHOWING CIRCULATION OF WATER.

Hot water leaves the top of the heater, flows up to an expansion tank and then down through the car piping, and back to the bottom of the heater. The car piping slopes continuously down from the top connection to the bottom connection of the heater. At the top, an opening to the atmosphere is provided through a small water tank, called an *expansion tank*. This prevents water pressure bursting the pipes as they become heated, and allows any steam that may have formed to escape.

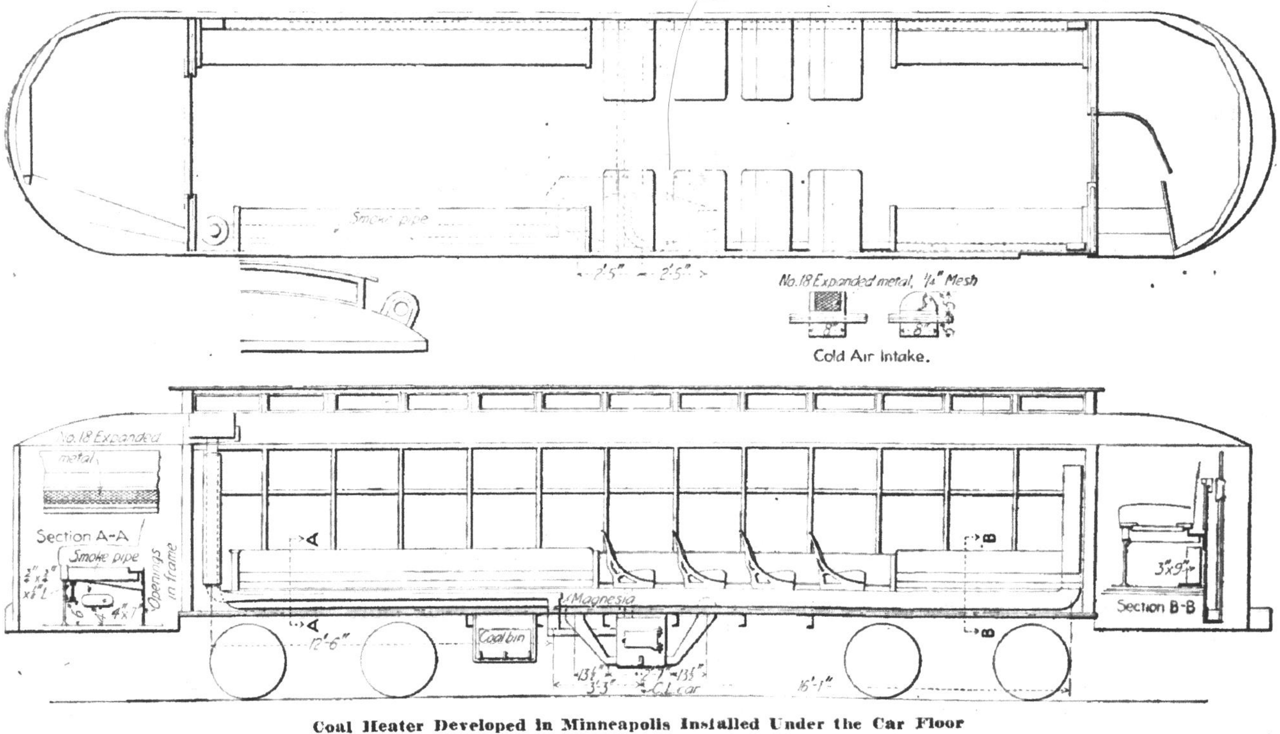
A New Development in Hot Air Heating

An interesting development in coal heaters has been made in Minneapolis. Here the heater is carried under the floor of the car. With a draft from below the smoke pipe is carried across under the floor and thence back and up, running horizontally under the longitudinal seat at one rear corner of the car in an appropriately protected duct to a vertical pipe leading overhead to a smoke hood on the roof. The heat radiated from the horizontal smoke pipe under the seats is allowed to enter the car through an expanded wire grill set into the front of the seat box. A sheet metal housing surrounds the stove and intakes lead up through the floor and terminate under two cross seats on the same side of the car on which the heater is located. A horizontal duct leads from the housing surrounding the stove up through the floor and along the truss plank to the forward corner of the car, where it rises vertically in the corner to a point just below the headlining. A second duct surrounding the smoke pipe leads from the stove housing across under the floor of the car to a second horizontal duct running the entire length of the car body on the opposite side from the stove. The rear end of this second horizontal duct terminates on the floor near the rear corner of the body and the front end turns up into a vertical stack in the same way as the duct on the opposite side of the car. The chimney action of the two vertical stacks in the front corners and the circulation produced by the heat from the stove causes air which enters at the floor intake under the two cross seats to move forward and up through the vertical stacks from which it then spreads into the car body.

A portion of the air which crosses under the car in the duct previously described also finds its way backward into the rear end of the car. Openings are cut through the car lining under longitudinal seats to the sash pockets which have openings below to the outside, so as to produce both a fresh air supply and a circulation over the hot air ducts to help distribute the heat in the car. Accompanying illustrations show the appearance of the heater under the car and the arrangement of apparatus in and under the body.

This same general arrangement of housing and ducts has also been utilized in an experimental installation in Minneapolis for the purpose of conducting the energy lost in the control rheostat to the car body interior for heating purposes. It would seem that the Minneapolis type of coal heater construction would have material advantages for use in installations on interurbans where it is desired to have an auxiliary coal heater available in connection with the electric heaters as previously mentioned.

*1613



Coal Heater Developed in Minneapolis Installed Under the Car Floor

Warm air ducts along the truss planks distribute the heated air through the body. Vertical stacks in the front corners of the car body help the circulation and distribution. The smoke travels in a flue, inclosed in an air duct, across under the car and back to a longitudinal smoke pipe located under the side seat and then up through the roof at the rear.

OCT 1904
20th ANNIV.
EDITION

THE WEIGHT OF EVIDENCE

The International Register Co.
CHICAGO
CASH
CASH FARES
TRANSFERS
141
63
IN
3069
2384

TYPE R 5 DOUBLE

ON page 872 of the June 4th issue of The Street Railway Journal, 42 street railway companies are named whose gross receipts in 1903 exceeded One Million Dollars. Of these 42, 4 do not use registers at all and 5 are largely equipped with New Haven registers purchased before we bought the business of the New Haven Car Register Company. Of the remaining 33, 21 placed their last order for registers with The International Register Company. We give herewith a list of the 21, to any of which we are pleased to refer, both as to the truth of this statement and the merit of our machines.

PHILADELPHIA RAPID TRANSIT COMPANY, Philadelphia, Pa.
BROOKLYN RAPID TRANSIT COMPANY, Brooklyn, N. Y.
BOSTON ELEVATED RAILWAY COMPANY, Boston, Mass.
CHICAGO CITY RAILWAY COMPANY, Chicago, Ill.
MASSACHUSETTS ELECTRIC COMPANIES, Boston, Mass.
UNITED RAILWAYS & ELECTRIC COMPANIES OF BALTIMORE, Md.
TWIN CITY RAPID TRANSIT COMPANY, Minneapolis and St. Paul, Minn.
CINCINNATI TRACTION COMPANY, Cincinnati, Ohio.
KANSAS CITY RAILWAY & LIGHT COMPANY, Kansas City, Mo.
MILWAUKEE ELECTRIC RAILWAY & LIGHT COMPANY, Milwaukee, Wis.
CLEVELAND ELECTRIC RAILWAY COMPANY, Cleveland, Ohio.
WASHINGTON RAILWAY & ELECTRIC COMPANY, Washington, D. C.
SEATTLE ELECTRIC COMPANY, Seattle, Washington.
LOUISVILLE RAILWAY COMPANY, Louisville, Kentucky.
UNITED TRACTION COMPANY, Albany, New York.
CONEY ISLAND & BROOKLYN RAILROAD COMPANY, Brooklyn, N. Y.
CAPITAL TRACTION COMPANY, Washington, D. C.
GEORGIA RAILWAY & ELECTRIC COMPANY, Atlanta, Georgia.
WORCESTER CONSOLIDATED STREET RAILWAY COMPANY, Worcester, Mass.
BIRMINGHAM RAILWAY, LIGHT AND POWER COMPANY, Birmingham, Ala.
CONNECTICUT RAILWAY & LIGHTING COMPANY, Bridgeport, Conn.

This preponderance of evidence as to what is considered best in registers by the largest companies, would certainly warrant a further investigation before an adverse decision is rendered. Our No. 4 Catalog gives other reasons, together with the only complete instructions for equipping cars with rod register fittings ever put in print.

THE INTERNATIONAL REGISTER COMPANY

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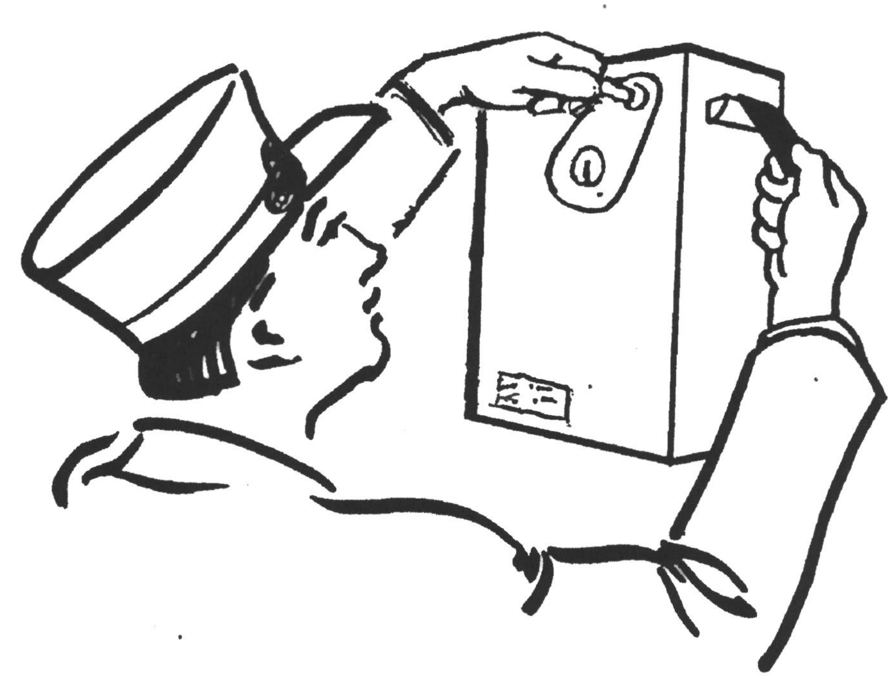
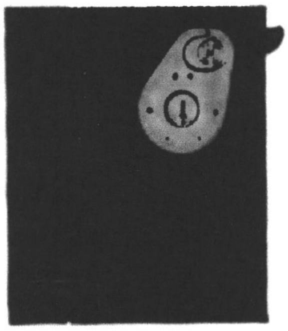
ERJ 1-5-1918
ADVERTISEMENT
REPORTED TCRT
PURCHASED 1100
RICO COASTING
RECORDERS



No Fallible Human Element in the

Rico Coasting Recorder

is interposed between the performers (the motormen) and the performance (the record of no-power or COASTING TIME).



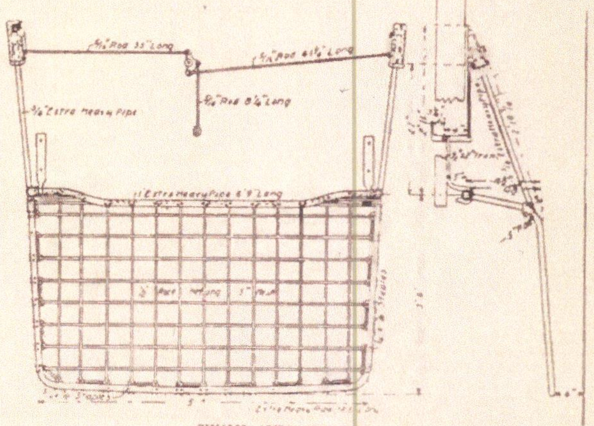
The mere fact that the Rico Coasting Recorder gives this trip-by-trip record of COASTING TIME only by use of the motorman's individual key, assures the immediate approval and cooperation of the man behind the controller.

Time is the Essence of Railroading

RAILWAY IMPROVEMENT CO. RICO 61 BROADWAY, NEW YORK

THE TWIN CITY FENDER.

As noted in our February, 1899, issue the Twin City Rapid Transit Company, of Minneapolis and St Paul, by means of safety gates and fenders has been able to greatly reduce the number of accidents involving personal injuries. The gates were fully shown in that issue, and we herewith illustrate one type of the fenders, with which nearly all the company's cars are equipped. The drawing shows the type first adopted and the slight modifications since made will be mentioned later. The frame is made of extra heavy 1-in. piping and fittings bent as shown in the diagram; staples of ¼-in. round iron are spaced 5 in., center to center, and ½-in. rope run



TWIN CITY FENDER.

through them to make a netting. The frame is hung from hooks and held in its normal position by two struts of ¾-in. extra heavy pipe, one at each side. One end of the strut is fastened to the fender frame and the other rests in a cast iron pocket bolted to the car sill; in each pocket is a dog which when pulled out (by means of the mechanism shown in the cut) when the motorman presses the tripping lever with his foot, permits the strut to go to the bottom of the pocket and the fender to fall to the rail. Normally the front edge of the fender is carried 6 in. from the rail on level track. The newer fenders are made 2 ft. 10 in., instead of 3 ft. 6 in., long, and the front corners are bent to a larger radius so that they do not project so much as that shown. Wire is substituted for rope, and run through holes in the pike frame instead of through staples.

These fenders are made by the company in its own shop, after its own designs and at small expense.

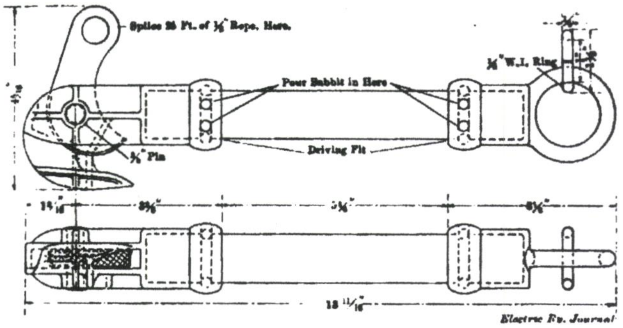
SRR 3-15-1899

PICK-UP AT MINNEAPOLIS

FEB 1909

Among the ingenious devices developed on the Twin City Rapid Transit Company is the trolley pick-up illustrated herewith. Two of these are carried on each car, and, as the name implies, they are designed to facilitate rapid repair of the overhead construction in case a trolley wire or a span wire should break. One of the pick-ups is fitted with 25 ft. of rope, which is attached to the end of the short lever. The rope on the other pick-up extends about 3 ft. beyond the end of the pick-up and has a noose.

To tie up a broken trolley wire the procedure is as follows: A pick-up is attached to each end of the broken wire. The free end of the long rope is then carried through the ring at the end of the pick-up to which it is attached. It is then passed through the noose on the short rope on the other pick-up, and is then pulled taut. This draws the trolley wire back to its normal position. The rope is then tied up until the wire car can arrive and repair the break.



Trolley Pick-Up Carried on Cars in Minneapolis

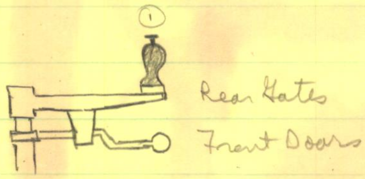
These pick-ups are manufactured in the shops of the company. The metal parts are of malleable iron. The wooden shank is of maple which is boiled in paraffine until it becomes saturated.

DESTINATION SIGNS

JANUARY 1901: ROLLSIGNS MENTIONED. SAID THEY WERE UNSIGHTLY BUT THIS WAS BEING REMEDIED.

JUNE 1901: DESTINATION ROLL SIGNS WERE FIRST USED IN JUNE. WERE INSTALLED ON ALL DOUBLE TRUCK CARS DURING 1902-1903

Front Exit Gate Cars
Door Control Levers



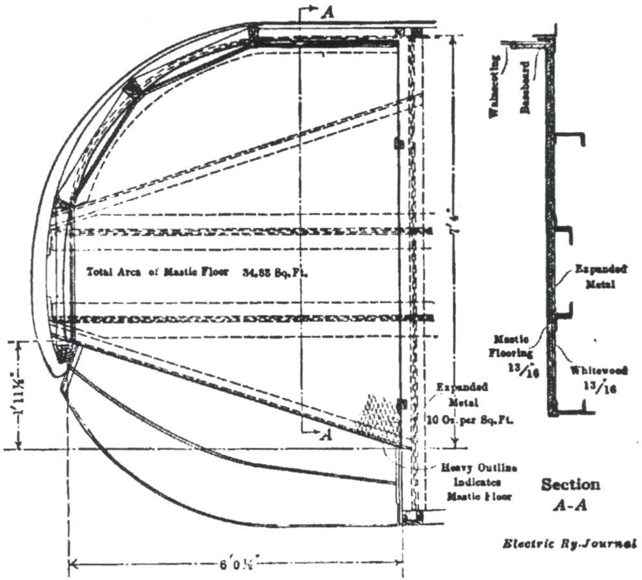
① Button, when pressed, engages lower lever for operating front door (could not open front doors if rear gates were not open).

ERJ

TWIN CITY CAR DETAILS

1-3-1914

The Twin City Rapid Transit Company, which maintains a car-building plant, has embodied in its cars several constructional features which are believed to be original with the company. For example, in the flooring which is planed and matched in the woodmill the useful wear is increased by placing the tongue and groove lower than usual. One sketch shows that the car wheels carry "squeak deadeners." These are round wooden blocks 4 in. in diameter and 7/8 in. thick, clamped on both sides of the wheel web near the rim. Canvas-rubber pads are placed under the blocks and the whole deadener is bound together by means of a 1/2-in. bolt. While the noise made when a car takes a crossing is not eliminated entirely by this muffler, it replaces the shrill squeal with a dull low-pitched rumble. The company is also trying other noise-muffling attachments, such as softer brakeshoes and canvas-rubber pads for insertion under the equalizer bar springs and even under the window sash.

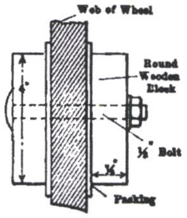

A
A
Total Area of Mastic Floor 34.83 Sq. Ft.
1'11½"
6'0½"
7'4"
Wainscoting
Baseboard
Expanded Metal
Mastic Flooring 13/16
Whitewood 13/16
Expanded Metal 10 Oz. per Sq. Ft.
Heavy Outline Indicates Mastic Floor
Section A-A

Electric Ry. Journal

Car Platform Arranged for Mastic Flooring

Part of the trucks in use were made by the Baldwin Locomotive Works, but at present all are made by the railway. These trucks are a light M. C. B. design. They are made complete with the exception of the journal boxes. General Electric motors (the standard now being Nos. 203 and 216) are used, but their riveted steel gear cases and all motor repair parts are made in the shops. The two sizes of Bessemer steel axles which suffice for the entire system have given absolutely no trouble from cracking. Truck parts, as well as other standard pieces, are made interchangeable and kept in stock so that a car injured in a collision can be repaired without delay by replacing damaged parts.

The rear platform of the Twin City cars, as shown in an accompanying drawing, is interesting in several ways. It is 6 ft. long with double steps set within the line of the side sills, the deep channel knees being set close together. Between the knees are floor supports made by two pairs of light angles. This steel frame carries a whitewood flooring on which a mastic flooring is troweled. The mastic is held together by 10-oz. expanded metal. The steps are of the standard pattern made up of corrugated strip in the shops. At the foot of the steps are four woven-wire safety gates which are operated by the motorman. Aside from these features the platform equipment is standard, including, for the interurban cars, red tail lamps.



Details of Squeak Deadener

Two car improvements now under way are of particular interest. The sheet-iron covers of the controllers on several hundred of the older cars are being replaced with wooden ones of oak veneered on both sides and supplied with a poplar foundation. These covers will eliminate frequent cause of short-circuits. Another safety installation is the equipment of all cars with a simple switch cabinet of transite board built on a wooden frame. This cabinet is located close under the hood against the front bulkhead of the car and is ventilated to the roof. It contains the circuit-breaker, pump switch, fuses and lamp switches.

EXTERIOR PAINT SCHEMES

The restoration and repainting of TCRT cars by the Minn. Transportation Musuem during 2003-2004 prompted this embellishment of the information in my book as well as Ed Nelson's notes on page 166-167 in Notebook 12. Refer to the two page essay "Paint Scheme-Exterior, One-Man Cars" for terminology.

Street Railway Journal
June 1896

Reported that TCRT had adopted a system-wide color of Lemon Yellow with trim colors of Green, Bronze and Silver.A program was developed to repaint all cars at the 3rd Ave. N. Shops (Minneapolis) at a rate of 15 cars per week.

On Open Cars the sills, trucks and fenders were Olive Brown with Lemon Yellow for the posts and upper parts. The paint formulas were printed.

Panel Color: Lemon Yellow
10 lbs. Lead in oil
1 lb. Lemon Chrome in oil
1/2 lb. Golden Ochre in oil
5/16 lb. Japan
Turpentine

Sill Color: Olive Brown
5 lbs. Golden Ochre
1/16 lb Prussian Blue
1 lb. Indian Red
1 lb. White Lead

GATE CARS WITH MOTORMAN'S CAB DOOR

We are dependent upon black and white photographs for the location of colors. Such photographs are subject to (1) sunlight or shadow, clear or overcast, (2) camera lens exposure and time, and (3) negative printing exposure time. So care must be taken in analyzing them.

Body, Deck and Deck Apron were Lemon Yellow. Roof Canvas, Deck Eaves Molding, Trolley Boards, Smoke Jack, and Whistle, were Red Iron Oxide. Window Sash (Body and Deck) were Red Mahogany. Body Eaves Drip Rail and the two Drip Rails on the Belt Rail were Olive Brown. Letterboard bottom stripe, vertical trim pieces (battens only), mirror frame and back, were Bronze. Body Striping, Motorman's Cab Door Striping, and Car Number were Silver outlined in Bronze. The Body and Deck were Varnished. Trucks, Steps, Fender, Bumpers, all Underbody Equipment, Headlight, Trolley Catcher, Sand Pipes, Gate Rod, were all Moss Green. Trolley Base and Trolley Pole were Black (as purchased from the manufacturer).

When the Front Exit Rebuilding program began in 1920 the use of Silver/Bronze Striping, Silver/Bronze Car Numbers, and Varnish were discontinued. All the cars with the sliding motorman's cab door were rebuilt with front exit doors. Cars with the hinged Motorman's Cab Door had the door repainted Moss Green. The Bronze striping was changed to Medium Brown (Striping Brown). A Medium Brown stripe along the bottom of the side sheathing was added. The Car Number was changed to Medium Brown. The entire vertical trim pieces on both sides of the rear Gates and Motorman's Cab Door were Medium Brown. The roof access handholds were mounted on a vertical trim piece so were Medium Brown. Olive Brown (Striping Brown Dip and Baking Enamel) continued in use on the Drip Rails.

FRONT EXIT-GATE CARS

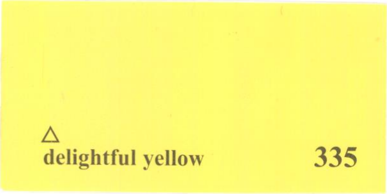
The One-Man Car paint scheme was based on this paint scheme. Refer to the preceding paragraph on the 1920 changes as well as the two-page essay on One-Man Cars. On the Front Exit-Gate Cars the Front Exit Doors were Moss Green, the vertical trim pieces on each side of the front exit door, and the stripe over the top of the door, were Medium Brown (Striping Brown). Trolley Base and Trolley Pole were Black (also on the One-Man Cars).

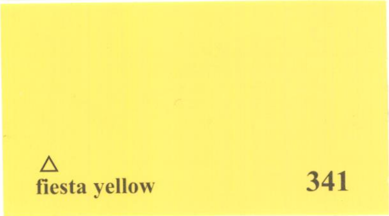
PAINT SCHEME-EXTERIOR

ONE-MAN CARS

(Benjamin Moore & Co. paint color chips used for illustrative purposes.)

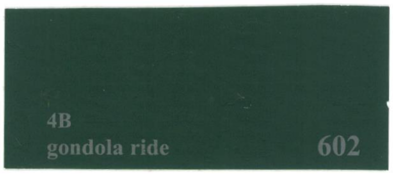
Body, Deck, Deck Apron:
Finish Coat: [Medium] Chrome Yellow. (1896: Lemon Yellow). Apr 52: Standard Yellow Enamel Dulux (Dupont Co.).



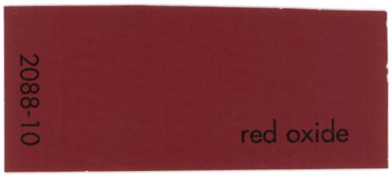


Prime Coat: See 1935/1938 Specification for Car Surfacer (Natural Color). Apr 52: Light Surfacer Dulux (Dupont Co.); White Wood Priming Dulux (Dupont Co.).

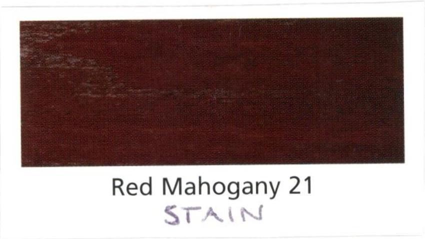
Trucks, Steps, Fenders, Bumpers, Skirts, All Underbody Equipment, Headlights, Trolley Catchers, Doors below the underframe: See 1931 Specification for Moss Green Baking Enamel. Apr 52: Moss Green Baking Enamel (Frost Paint Company).



Roof Canvas, Deck Eaves Molding, Trolley Boards, Smoke Jack, Whistle, roof access Handholds: See undated (1930's) Specification for Red Floor Paste--iron oxide semi-paste paint for use in surfacing car floors and canvas-covered car roofs. See 1929 Specification for Mineral Iron Oxide--iron oxide and iron hydrooxide pigments of mineral origin and of red color. Apr 52: Tector Canvas Priming (Pittsburgh Co.).



Window Sash (body and deck): Apr 52: Mahogany Sash Enamel (Frost Paint Co.). Ed Nelson called it Tuscan Red. Red Mahogany color.



2005-10
red rock

Body Eaves Drip Rail and the two Drip Rails on the Belt Rail: Apr 52: Striping Brown Dip and Baking Enamel (Frost Paint Co.). Referred to as Olive Brown. I understood this to be a special water resistant paint for these trim pieces, which had to be steamed and bent for the platform ends, and were susceptible to water and melting snow run-off from the roof and windows.

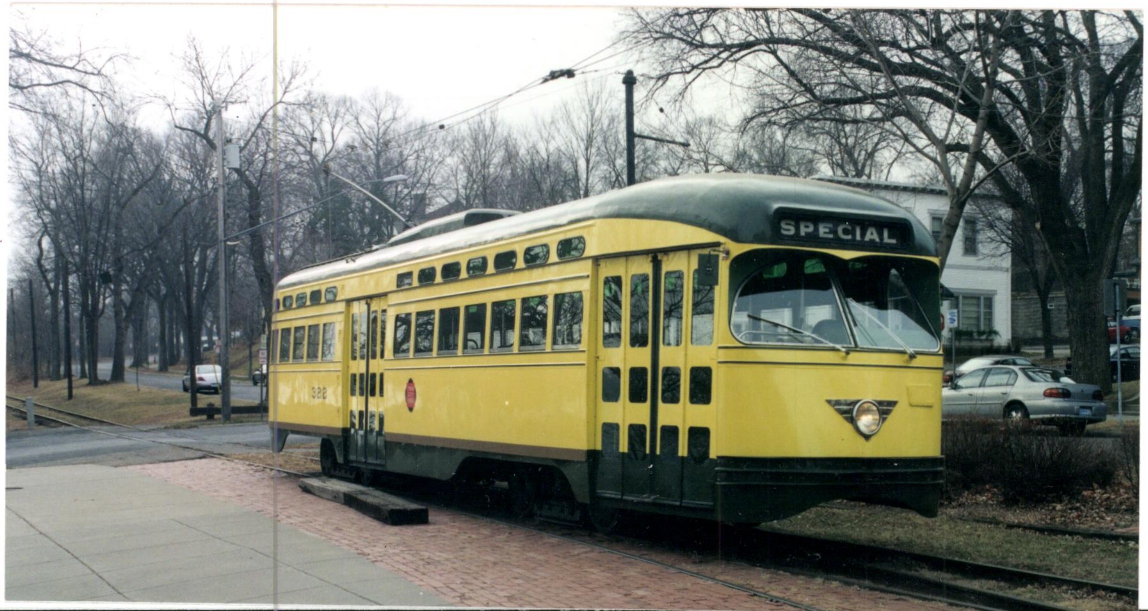
4B
greenbrook 517

Striping, Letters and Numbers: Letterboard bottom stripe, Stripe along the bottom of the side sheathing, all vertical Wood Trim pieces on both gate side and pole side, horizontal Stripes over front and rear doors, Mirror frame and back, Car Number, "Stop 10 Feet Back" Lettering on rear platform gate side end. Apr 52: Striping Brown Enamel Dulux (Dupont Co.). Referred to as Medium Brown. Roof access handhold/step castings: the flat part which attached to the carbody was painted Chrome Yellow, while the remainder of the casting was painted Medium Brown.

3B
maple valley 1057

Trolley Base And Trolley
Pole Were Black.

Photograph Below Was Taken
On An Overcast Day So The
Colors Appear Slightly
Darker Than In Sunlight.
However They More
Accurately Show The Yellow,
Striping Brown And Moss Green.



LIGHTWEIGHT CARS

Same as the One-Man Cars paint scheme except for:

Moss Green		
	Skirts	On cars 1-4, the sloped part of the bumpers was Lemon Yellow.
Natural Wood Finish		
	Doors	In 1948 doors were painted Lemon Yellow above and Moss Green below the underframe.

PCC CARS

- Moss Green Enamel Dulux (Dupont Co.)
  - Roof
  - Two stripes between the standee windows and the side windows
  - Two belt rail stripes
  - Trolley retriever, tail lights and front rear view mirror
  - Skirts, doors below the floor line, bumpers, underbody equipment, lifeguard assembly, and trucks
- Standard Yellow Enamel Dulux (Dupont Co.)
  - Car body, including fluting above the standee windows
  - Doors above the floor line
- Striping Brown Enamel Dulux (Dupont Co.)
  - Seam between the roof and the carbody side
  - Car Number on body side
  - Lettering on rear end
  - Rub Rail at the floor line above the skirts
  - Window sashes, headlight and headlight wings were chromium plated.
- Black Roof mat, trolley base and trolley pole

SERVICE EQUIPMENT

Work Cars 7-19,46-48,51-56,62-69; Wire Cars 3-5,72; Work Car 33; Refuse Car 49; Shifter Cars 26-28; Wrecker 21, Sand Blast Car 35; Crane Cars,50,83; Track Dept. Supply Cars 58,61; Sprinkler Car 59, Rail Grinder 96:

Freight Car Red overall, including side and end sills, and body components.
White Numbers
Moss Green: Underbody equipment, trucks, fenders, headlights. In later years the headlights were also Freight Car Red.
Red Iron Oxide Roof Canvas.
Black and White striped Bumpers:3-5,72; 50 (after rebuilding 1947-48); 96.
At one time 96 also had a white design on the front dash below the belt rail.

Crane Car 50 after 1948 rebuilding had Orton colors on the crane: Aluminum cab, Black boom and bucket.

Snow Plows 22-24,29-32,36-38,75-82 (Note there were variations over the years.)
Lemon Yellow: Car Body, including side and end doors on most cars.
Moss Green: Underframe, snow plow, plow equipment and machinery, trucks, headlight, classification lights.
Medium Brown: Vertical wood trim, numbers, side door on 22.
Red Mahogany: Window sash.
Red Iron Oxide Roof canvas.

Sand Cars 43-45
Lemon Yellow above the belt rail and Moss Green below the belt rail: Car Body.
Passenger Car color scheme for the letterboards, front and side, and belt rail on front and rear platforms;
Medium Brown: Side belt rail between the Lemon Yellow and Moss Green.
Medium Brown: Vertical wood trim.
Moss Green: Doors, headlight, classification lights, bumpers, underbody equipment, trucks
Red Mahogany: Window sash.
Red Iron Oxide: Roof canvas.

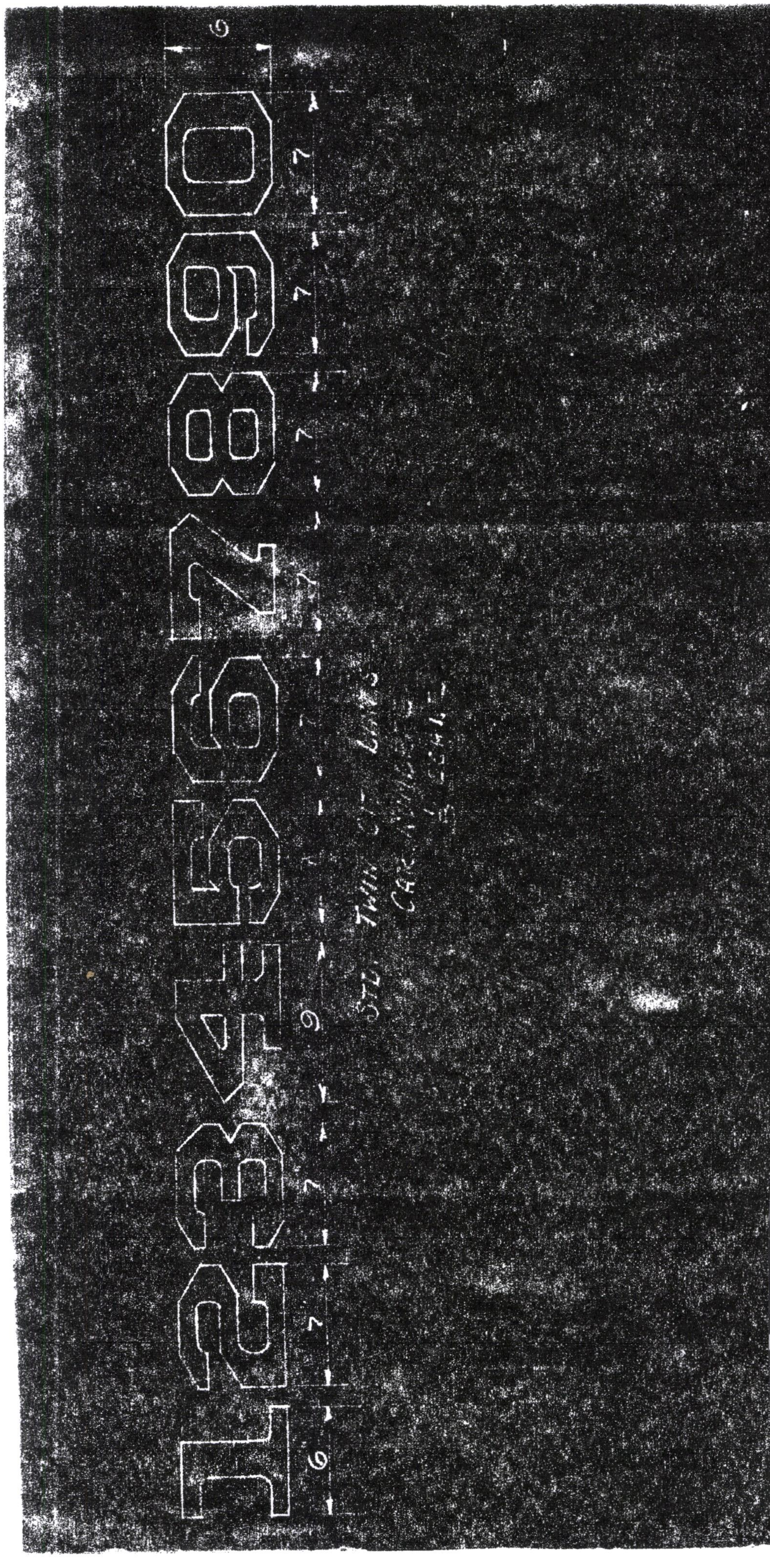
Supply Car 2II
Passenger Car color scheme with Moss Green doors, front and side, and loading door sill.
Supply Car 95
Passenger Car color scheme with Moss Green doors, front and side, and loading door sill.
Later repainted Freight Car Red overall; retained Moss Green trucks and underbody equipment.
Supply Car 97
Freight Car Red overall but retained the Moss Green bumpers, front exit doors, skirts, underbody equipment, and trucks.

Locomotive 20
Appears origionally to have been painted the Freight Car Red overall with White Numbers.
In later years the body was Lemon Yellow with Moss Green for the underframe, headlights, air cylinder, pipe railings and trim.
Red Iron Oxide roof canvas.

Baggage Car 34
Supposedly used the Passenger Car color scheme.

UofM Switch Car
Maroon overall, with Gold trim and lettering. (Appears that the pilot, underbody equipment and trucks were Maroon.) Red Iron Oxide roof canvas?

Electric Shovels 57,60,73,94; Yard Crane 74
Sand Blast Car 70, Pavement Plow 71
Freight Car Red overall except the running gear.


1234567890
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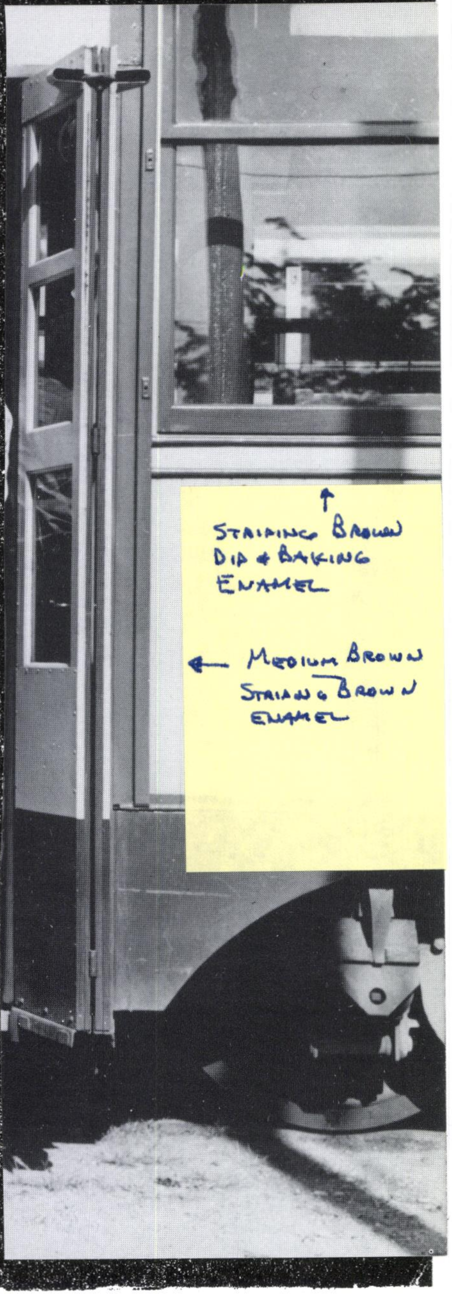
STD. TWIN CITY LINES
CAR NUMBERS
SCALE



↑
STAINING BROWN
DIP & BAKING
ENAMEL

← MEDIUM BROWN
STAINING BROWN
ENAMEL

TRANSIT SUPPLY COMPANY

MECHANICAL DEPARTMENT

SPECIFICATION NO. 37

CAR SURFACER (NATURAL COLOR)

1. The material desired shall be a lead free natural color surfacer suitable for outside car bodies.

2. The surfacer to consist of about 72% pigment and 28% vehicle.

3. The pigment shall consist of:

Titanium white	42%
Silicates	58%

4. The pigment shall be free from white lead or other lead compounds.

5. The vehicle shall consist of primer liquid, Japan drier and mineral spirits, in such proportion as to produce good drying and binding qualities. The surfacer shall dry bone hard, not flake off and sand paper readily. The vehicle shall be of such composition that the enamel will not strike in the surfacer.

6. The surfacer shall be finely ground. Coarse particles and skins (total residue retained on a No. 325 seive) not more than 1% of the dry pigment.

APPROVED ______________
Supt. of Equip.

6-1-35
5-3-38

TRANSIT SUPPLY COMPANY

MECHANICAL DEPARTMENT

SPECIFICATION No. 29

MOSS GREEN BAKING ENAMEL

SCOPE	This enamel will be used for Trucks, Gates, Steps, Fenders, Bumpers, and all car equipment such as Pumps, Air cylinders, Air tanks, Etc.
MATERIAL	The material required, under these specifications, is a durable, high quality, moss green enamel, ready to apply for outside use. It must be suitable for baking and air drying. It shall be made by grinding pure, high color, strength pigments with the best water resisting gloss enamel vehicle. (lacquers not allowed). It shall conform to the following properties.
Weight per gal.	Not less than 8¼ pounds.
Pigment	To be composed of Lead Chromate, Iron Ferro and Ferricyanide Blue, with or without lead compounds and suitable blacks to produce the color that match, Twin City Lines, standard shade. Pigment shall not contain over 6% Insoluble inert material and it shall not contain over 15% Calcium in any form known as calcium oxide. It must not contain organic coloring matter, (dyes or lakes).
Non Volatile Matter 105° to 110° C.	Not less than 60% by weight.
Coarse Particles and Skins	Total residue retained on No.325 seive, not more than 1.5%.
Dry Hard and Tough	It must air dry (70° F.) in not more than 18 hours and must bake hard at 275° F. in not more than 4 hours.
Working Properties	Enamel must have good brushing, flowing, covering and leveling properties. It must not cake in the container, nor the liquid skin over. The enamel must produce a durable, high gloss, finish.
Water Resistance	Enamel flowed on glass and air dried in 48 hours, must withstand the action of cold water for 18 hours, without whitening, dulling, or change of color.
Rejection	Enamel which fail s to meet these requirements will be rejected.

10-8-31

Approved

MASTER MECHANIC

TRANSIT SUPPLY COMPANY

MECHANICAL DEPARTMENT

SPECIFICATION NO. 18

MINERAL IRON OXIDE

1. This specification covers iron oxide and iron hydroxide pigments of mineral origin and of red color.

MANUFACTURE

2. Dry Pigment—The pigment shall be finely ground iron oxide or iron hydroxide or a mixture thereof. Siliceous minerals may be present and if necessary, sufficient carbon pigment may be added to produce the desired color.

PROPERTIES AND TESTS

3. (a) The mass color and character of the tint formed by mixture with a white pigment shall be the same as, and the strength not less than, that of a sample mutually agreed upon by buyer and seller.

(b) Dry Pigment—The pigment shall conform to the following requirements:

	Maximum	Minimum
Ferric Oxide, per cent		40.0
Material other than ferric oxide, insoluble siliceous matter, and loss on ignition, per cent	10.0	
Coarse particles retained on a No. 325 sieve, per cent	3.0	

Organic coloring matters shall be absent.

4. Shipments which fail to meet these requirements will not be accepted.

Master Mechanic

7-30-29

TRANSIT SUPPLY COMPANY

MECHANICAL DEPARTMENT

SPECIFICATION M-30

RED FLOOR PASTE

1. SCOPE This specification covers iron oxide semi-paste paint for use in surfacing car floors and canvas covered car roofs.

2. PROPORTIONS (a) This paint is desired in semi-paste form, and composition shall be in accordance with the following requirements:

	Maximum	Minimum
Pigment, per cent by weight	63	59
Vehicle, per cent by weight	41	37

(b) The paint shall be free from alkali water, water soluble soap, and organic coloring matter (dyes or lakes). It shall be well ground, and shall not settle badly or cake in the container.

(c) It shall break up readily in linseed oil to form a smooth paint, and shall mix readily with linseed oil or mineral spirits in any proportion without curdling or livering, either at once or on standing.

(d) When reduced with turpentine to a brushing consistency and brushed upon glass the paint shall dry hard in not to exceed 5 hours at a temperature of approximately 70° F.

3. PIGMENT The pigment shall conform to the following requirements:

	Maximum	Minimum
Ferric Oxide, per cent		30
Calcium in any form, calculated to calcium oxide, per cent	8	
Magnesium Silicate (asbestine), aluminum silicate, or other siliceous materials, per cent	The remainder	
Coarse particles and skins left on No. 325 screen per cent	2	

VEHICLE The liquid shall consist of linseed oil, driers, and volatile thinners.

The total volatile in the vehicle shall not exceed 55% by weight.

SHIPMENTS Shipments which fail to meet requirements of these specifications will be rejected.

APPROVED

PAINT MATERIAL SENT TO STOREHOUSE

Moss Green Baking Enamel	Frost Paint Co		75	Gal.
Mahogany Sash Enamel	Frost Paint Co		50	Gal.
Striping Brown Dip & Baking Enamel	Frost Paint Co		22	Gal.
Green Gray Semi Floor Paste	Minnesota		30	Gal.
Tector Canvas Priming	Pittsburgh Co		30	Gal.
Red Freight Car Paint	Glidden		30	Gal.
Standard yellow Enamel Dulux	Dupont Co		20	Gal.
Light Surfacer Dulux	Dupont Co		65	Gal.
White wood Priming Dulux	DupontCo		60	Gal.
Luminal White Water Paint	National Chem. Co		35	Gal.
Luminal Sea Green Water Paint	National Chem. Co		60	Gal.
Pure Graphite in Oil	Minnesota		24	Gal.
Indian Red in Oil	Minnesota	307 # or	13	Gal.
Lamp Black in Oil	Minnesota	59 # or	7	Gal.
Wallhide First Coater	Pittsburgh Co		35	Gal.
Venetian Red in Oil	Minnesota		2	Gal.
French Zinc in Oil	Masury	62½ # or	2-1/2	Gal.
Light Green Semi Gloss Enamel	Dupont Co		12	Gal.
Dark Green Semi Gloss Enamel	Dupont Co		17	Gal.
Moss Green Enamel Dulux	Dupont Co		33	Gal.
White Enamel #260	Minnesota		5	Gal.
Striping Brown Enamel Dulux	Dupont Co		5	Gal.
Machine Gray Enamel	Areo Co		4	Gal.
Ivory Semi Gloss Enamel	Minnesota		14	Gal.
Light Oak Floor Enamel	Minnesota		5	Gal.
Krak no Glazing White	Johnston		19	Gal.
Black Screen Process Paste	Pittsburgh Co		26	Gal.
Ceiling Cream Gloss Enamel	Dupont Co		5	Gal.
All Purpose Varnish	Glidden Co		50	Gal.
Spec. Black Stove Paint	Pittsburgh Co		10	Gal.
Rattan Seat Enamel	Minnesota		43	Gal.
Japan Drier	Minnesota		5	Gal.
Wedgwood Blue Flat Wall Paint	Elliot Co		4	Gal.
Wallhide Flat White Wall Paint	Pittsburgh Co		25	Gal.
Wallhide Eye Rest Green Flat Paint	Pittsburgh Co		40	Gal.
Burnt Sienna in Oil	Masury	19-1-Qt. cans	4-3/4	Gal.
Raw Umber in Oil	Masury	3-1-Qt. cans	3/4	Gal.
Med. Chrome Yellow in Oil	Masury	4-1-Qt. cans	1	Gal.
Vandyke Brown in Japan	Masury	3-1-Qt. cans	3/4	Gal.
Burnt Umber in Japan	W. H. Sweney Co	4-1-Qt. cans	1	Gal.
Burnt Sienna in Japan	Masury	4-1-Qt. cans	1	Gal.
Drop Black in Japan	Masury	2-1-Qt. cans	1/2	Gal.
Lamp Black in Japan	Masury	1-1-Qt. can	1/4	Gal.

4-17-52

PAINT MATERIAL SENT TO STOREHOUSE

Green Gray Floor Paint	Frost Paint Co	55	Gal.
Oakits Stripper (1 barrel)		460 #	
Brown Leather Lacquer		4	Gal.
Dulvar Varnish	Minnesota	6	Gal.
Light Green Semi Gloss Enamel	Dupont Company	5	Gal.

4-18-52

Undercoat for white Enamel	Pittsburgh Co	7	Gal.
Dic a Doo paint Cleaner		100 #	

4-21-52

MOSS GREEN BAKING ENAMEL

Specification No. 29 (excerpts)
10-8-1931

Will be used for Trucks, Gates, Steps, Fenders, Bumpers and all car equipment such as Pumps, Air Cylinders, Air Tanks, etc. It shall be made by grinding pure, high color, strength pigments with the best water resisting gloss enamel vehicle (lacquers not allowed).

Pigment to be composed of Lead Chromate, Iron Ferro and Ferricyanide Blue, with or without lead compounds and suitable blacks to produce the color that matches Twin City Lines standard shade. Pigment shall not contain over 6% insoluble inert material and it shall not contain over 15% calcium in any form known as calcium oxide. It must not contain organic coloring matter (dyes or lakes).

MINERAL IRON OXIDE

Specification No. 16 (excerpts)
7-30-29

Specification covers iron oxide and iron hydroxide pigments of mineral origin and of red color. Dry pigment shall be finely ground iron oxide or iron hydroxide or a mixture thereof. Silicaous minerals may be present and if necessary, sufficient carbon pigment may be added to produce the desired color.

ED NELSON'S NOTES

1930 DESCRIPTION OF CAR CONTROL & DOOR OPERATION, 2000-2030.

(Note. This system was not kept in use very long, as it caused slow operation and invited some accidents, as if brakes were released, open rear doors would automatically close.)

-When motorman applies air brakes, a piston actuated trip in line breaker disconnects controller from power supply. (This still happens on 1-man cars with application of a large amount of pressure).

-Air for doors is from air cylinder line, so doors cannot be opened unless brakes are on. (Very slow if proper stops were made, with brakes released for smoothness of stop, then reapplied for opening doors).

-Door engine was of differential type, with door closing cylinder smaller than door opening cylinder, and always directly connected to air reservoir line, so that when doors were closed and brakes released, doors were locked in closed position.

-Motorman's air valve was spring actuated--the dead-man also tripped the circuit breaker and cut off current from motors (same now).

-Auxiliary device on controller is L.B.2 control, which trips circuit breaker. If controller moved back one or two notches, it cuts out, and motorman must start "notching" controller from beginning. (Still the same on 1-man cars, good in that main switch does not have to be re-set when circuit breaker is tripped.) (Note. Brakes will not cut out power to controller set on only one notch. Therefore in using back-up control, controller must always be set on at least two notches; if on one notch only, car would move as soon as brakes were released).

-Doors normally operated by motorman, but conductor can operate rear doors. (Special housing had to be made for rear door switch under rear seat, as sometimes passengers tripped it with their feet and doors flew open), Conductor's controls later removed.

-Front doors interconnected with rear doors so that rear doors can be used alone; but "front doors may not be opened unless rear doors are also opened. This is a signal to motorists." (This apparently applied to 2000 cars only, and the feature was discontinued. (On gatecars, the construction of the gate rod controls requires that rear gates be opened if the front doors are to be opened.)

-All doors operated electro pneumatically by means of toggle switch and magnet valves.

NON-MANUAL GATE CAR

About 1922, one triple-gate car was experimentally equipped with rear gates operated either by electricity or air.

Some experiments were carried out in control of rear gates by the conductor, but normally the motorman had control, with the responsibility for seeing that gates were shut while car was in motion.

GATE CONTROL, 1600-SERIES TRAINS

Motor car gates apparently under control of motorman, as normal.

Trailer gates controlled by trailer conductor.

Electric front exit doors of trailers controlled by switch operated by conductor of motor car.

Also note on these trains: All vestibule windows blocked on ends where cars were coupled. All trains had one wire spring guard between cars just over draw bars.

TWIN CITY CARS

SHEATHING.

Sides and ends, all standard cars: 9/16" x 2 1/4" whitewood.

Steel sheathing, 1/16" steel, was put on 287 one-man type cars from 1938 to 1950, the cars being any on which most of the wainscotting was found to be rotting. Car numbers ranged from 1166 to 1854. See individual car histories.

The first two steel side cars were 1724 and 1759, equipped in 1938. The end panels on 1724 did not then cover the anti-climbers, but on all other cars they did, giving the ends a sloping, somewhat streamlined appearance. On three cars done in 1939, 1543, 1570, and 1834, all rivets were puttied up and painted over, all the panels appearing as smooth as the siding on the lightweight cars. This, however, made it much too hard to remove the sections when necessary. 1543 was changed in 1944, and 1570 in 1949.

Siding of all the lightweight cars was of Masonite board.

ROOFS.

All car roofs were canvas over whitewood.

All 1,234 standard cars had monitor roofs (deck roofs), as did lightweights 2000 and 2000A. 2002 and 2003 had high arch roofs (dome roofs); all other lightweights, regular arch roof.

MONITOR SASH.

All standard cars had 11 Florentine glass panels (frosted) to a side, plus one double-width clear panel for the destination signs. On cars up to at least 899, this was set with three frosted panels to the rear of it; on later cars, with two to the rear.

The end monitor sash were one clear glass at the front for the destination sign, and red glass at the rear. The red glass was of one piece in cars up to 1359, but was divided into three sections on cars 1360 and above.

SIDE SASH.

Cars 868-899, 11 windows to a side; other standards, 13 to a side. Each such "window" comprised one drop sash and one upper fixed sash, though on at least some 940-series cars used on Sightseeing, all the sash could be dropped, making the car practically an open car. Window sizes of different groups of cars xaxx varied slightly; typical measurements (car 1579) were 28 3/4" x 27 1/2" drop sash; 28 3/4" x 17" fixed sash. Biggest difference is for cars 868-899; 28 1/4" x 27 1/2" drop sash; 28 1/4" x 13" fixed sash.

On standard cars with sliding cab door, first window on gate side, which cab door slid back against, was of fixed sash only; and there was no storm sash for this window (see storm sash below).

TWIN CITY CARS.

SIDE SASH, SCREENS AND WINDOW GUARDS.

All standard cars had each side window fitted with an individual screen of the size of the drop sash, but on the pole side only. Only known exception is that St. Louis Park cars in early years were always equipped with screens on both sides, as were also double-end cars.

In summer riders could always ~~tt~~ stick their head out the window on the gate side, not a common feature of riding on other systems; and on high school football specials, the entire load of riders often exited through the windows.

To dispense with the necessity for removing and replacing all the individual screens every time a car was washed, window guards were designed in 1945 and were to have been put on all one-man cars. Twelve window guards were placed on the pole side of a car (none on the first window, which had the hot air pipe in front of it). The former drop sash could be raised about fourteen inches and rested on top of the window guard. These were popular with women riders, who could enjoy the breeze without having it blow their hair about.

The first window guard installations were in 1731 and 1803 on Sept. 4, 1945. All Snelling Station ~~xxxxxxxxxequipped~~ one-man cars were equipped in a short time, as that station had got an automatic car washer. Then, as cars came in for rehabilitation, all North Side cars (except two), and later about half the Nicollet cars got window guards. 16 more Nicollet and Lake St. cars were equipped in 1951, in Mr. Green's car repainting program. All these stations had car washing machines. In all, 237 one-man cars were equipped with window guards.

The 2000s had sash which could be either dropped or raised and set at various heights. Instead of screens, they had window guards of long tubing outside the pole side windows.

PCCs had inside individual window guards on both sides of the car, preventing anyone from sticking his head out anywhere.

When curtains of standard cars are not lowered, standing riders ~~xy~~ enjoy a ~~better~~ better view than they would through PCC standee window

STORM SASH.

Cars up to 1424 had full-length storm sash on all side windows, each storm window covering both the drop sash and fixed sash. Cars 1425 and above have half-length storm windows, covering only the drop sash. Larger ventilating openings and better heat circulation were supposed to keep these cars as warm as those with full length storm sash but generally they ~~xd~~ did not stay as warm. In 1928, one full-length storm window was installed on each of these cars, on the last gate side window opposite the conductor's position; this gave the conductor a clear view out if the other fixed upper sash should freeze over.

The only cars with storm sash on the ends were the high-speed suburban cars and Stillwater local cars, with full length storm windows around the front vestibule; and Stillwater local cars # 1- # 4, with half-length storm windows on the front vestibule.

REAR PLATFORM WINDOW GUARDS. All standard cars equipped with these, 3 bars of brass tubing across each window on rear platform. These were all removed during the war and replaced by single wooden board.

CAR FLOORS

Floors of all standard and lightweight cars were of ~~ask~~ oak.

Car 1360 was equipped with a "mastic floor" (a cement-like compound over the wood) on Nov. 30, 1932. Also at about this time, as an experiment, car 1614 was given a mastic floor throughout the car, except for the front platform (this while 1614 was a gatecar); this floor added 2,000 pounds to the weight of the car, and was therefore removed later, and not ~~x~~ so installed in other cars.

The mastic floor was then installed on the rear platform of all cars in service (1136 had it); and later cars rebuilt to one-man were so equipped on the front platforms. But none of the lightweights ever got mastic floors.

CAR INTERIORS

Interior woodwork of all the standard cars was of birch, with a cherry finish.

The interior finish was changed in 1930, to a natural wood finish. All front exit and one-man type cars were so refinished. The first car done, 1495, on July 19, 1930, was specially transferred from Snelling Station to East Side Station, to be put on a Hennepin Ave. run so that Mr. Lowry and Mr. McGill could easily inspect it; this car then stayed at East Side several years, the lone 1400 there.

The few metal surfaces in the cars, such as back-up control box and the switch-box on one-man cars (out of sight of passengers), were painted to resemble wood surfaces.

Ceilings were repainted after 1935, some ivory, some white, with white eventually becoming standard. First done were 1385, with ~~x~~ ivory ceiling Aug. 1, 1935; and 1509, with white ceiling, Sept. 28, 1935.

EXTERIOR PAINT SCHEMES

REVISED

~~Body, yellow; medium-brown trxim trim above floor line.~~

~~Roof and sides window sash, tuscan red.~~

~~Trim and equipment below floor line, grass green~~

~~Rear gates, grass green; front cab door, yellow.~~

~~Numbers painted in silver, with silver striping around car, until 1920. Thereafter, striping discontinued, numbers painted medium brown.~~

~~Front exit doors, when installed, painted grass green; and thereafter, front cab doors of cars not so rebuilt, also painted grass green.~~

~~Doors of standard one-man cars, yellow.~~

~~Doors of lightweight cars, finished in natural wood color until 1948; thereafter repainted yellow.~~

~~PCC color scheme same as one-man cars, except for dark~~ green trim ~~green roof.~~

Black, red, and gold "Twin City Lines" ~~f~~ decals were placed on the PCCs as they arrived from 1947 on, and thereafter on lightweight cars and steel side cars as they were rehabilitated or repainted.

SPECIAL PAINT SCHEMES

1506 (Snelling) and 1695 (Lake St.) were painted red, white, and blue on Dec. 1, 1942, advertising war bonds and stamps. Both were steel side cars; 1506 was rotated on runs in St. Paul, and 1695 in Minneapolis. Repainted in normal colors, probably about June, 1944.

From February to July, 1952, the steel siding of 1209, completely around the car, was repainted white, with Army and Air Force lettering and decals advertising recruiting.

The entire interiors of two cars were finished in green (with white ceiling) in 1945, experimentally called a "PCC finish": 1749, 5-28-45, interior re-done to standard finish in 1950; and 1441, 8-1-45, still green inside. These done about time PCC 299 repainted to TCL colors.

STANDARD CAR SEATING ARRANGEMENTS; 48 SEATS

Standard local cars as built:

```
            ----------'''''''
Rear exit             '''''''
& entrance

                      '''''''
            6c--------'''''''
```

Long benches at rear seated ten on each side; 7 rows of double cross seats totaled 28 seats.

Short cars 868-899: 6 rows of double cross seats; capacity 40.

Front exit cars rebuilt 1920-1924:

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            ----------''''-----
                      ''''

                      ''''
            ----------''''-----
```

3 rows double seats removed, replaced by benches seating five each; providing more standing room near front exit (also used as entrance on Interurban lines)

Front exit cars rebuilt 1928,
cars 1254, 1266-1328:

```
            -----'''''''-----
                 '''''''

                 '''''''
            -----'''''''-----
```

These improved cars again had seven rows of cross seats.

Following the rebuilding of these 1254-series cars, all other front exit cars (526 cars) had their seating changed to correspond with 1254. This arrangement retained for all standard one-man cars. On front exit and one-man cars with hot air heaters, the seating capacit is actually 47, with the stovepipe displacing the last rear gateside sea

LIGHTWEIGHT CARS.

The arrangement shown for 1254 was actually first used in train cars 2004 and 2005, and was used for 2006-2030 when built. Seats in 2000-2003 were later made to conform to this pattern. In addition, a single seat on the pole side of the front platform, just behind the motorman, made the standard seating capacity of the 2000s, 49 seats.

Train car 2000 had the old standard car arrangement, with long benches at the rear, capacity 47; and trailer 2000A had the long benches at the front, plus a circular seat around the enclosed rear platform, capacity 54.

2002 and 2003 had five rows of cross seats in the center of each car, with side benches at front and rear being longer than in 1254. Capacity of each, 48, increased to 57 in 2003 by circular seat around the front platform.

Cars # 1- # 4 had a modification of the standard 2000 arrangement; 36 seats in the car body proper, made up of six rows of cross seats in the center, with three-seat side benches at front and rear. Seats around the rear platform increased capacity to 42.

Note. Crossseats only, capacity 50, in cars 900-949 as built for Interurban line in 1902; ditto in Stillwater cars 775-785.

SEATING ARRANGEMENTS (CONTINUED)

SPECIAL DOUBLE-END CARS

Cars # 3 and 1129 were equipped with reversible seats; others were not.

The arrangement in 1129 and 1230 was the same as for 1254.

3 was not changed, except for removal of the rear platform seat; capacity 36.

4 had all seats removed, and was given long benches on each side of the car (no cross seats); capacity 36.

200-SERIES TRAILERS

When converted to trailers, all cross seats were removed from 200-225, and longitudinal seating installed; with circular seats around the front platform, capacity was 57.

In 1930, ten trailers intended to be kept in permanent train use, cars 200-208 and 210, were equipped with seven rows of cross seats arranged similarly to those in 1254. 208 & 210 DONE IN 1929.

SUBURBAN CAR SEATING

The high-speed suburban cars, and some 940-series cars used in early years on sightseeing trips, had cross seats throughout the car, with no side benches. Capacity was 50, with single seats in the a last row, to facilitate entrance through the bulkhead doors. One of these seats was removed, and capacity reduced to 49, in certain cases including the following:

When cars went in local winter service, using PAYE system;
On some eight cars retained for PAYE Mahtomedi service after 1932;
On cars retained for the Inter Campus line.

Same 50-seat arrangement in 1911, in 1450, special front exit car.

PCC 299

This came to Minneapolis with the Pittsburgh seating arrangement, with longitudinal seating between front and center doors, capacity 55.

```
          ' ''''' ------------------
  (rear)  ' '''''                                30 in long seats, 20 in cross
          '                                      seats, 5 in rear cross seat.
          ' '''''
          ' ''''' door ------------
```

The conductor had to stand at first, with farebox suspended from post by center doors. Later he was given fixed seat opposite center doors, reducing passenger seating capacity to 53.

PCCS 300-439

These cars had cross seats only, with single seats forward on gateside to provide more standing room; if these were doubles, car would seat 62 as such cars do in most cities.

The one-man cars 340-439 seat 55, with arrangement shown below; two-man cars 300-339 seat 53, the center double seat opposite center doors being displaced by conductor's position. His seat, when not used, was raised against seat back by means of a spring, so passengers would not take it while conductor was standing.

```
          ' '''''''C''''''''
  (rear)  ' ''''''''''''''''
          '
          ' '''''   '
          ' '''''drs'''''''
```

SEATS & COVERINGS

All cars built by TCRT were equipped with rattan seats (yellow).

Plastic (Saran) woven seats, resembling rattan but with slightly smaller weave, were placed in some cars in 1944 and 1945. About 20 cars got green seats of this material, commencing with 1466 (6-7-44) and 1707 (6-22-44), and including 1441 and 1749 with their "PCC inside finish". Perhaps about the same number of cars got seats of this material, finished in yellow instead of green.

Smooth green Pantasote seat coverings were placed in 1615 on 1-21-44, and thereafter in another 10 or 15 cars.

From 1947 on, green Koroseal seat coverings, used in the PCCs, were placed in more than 60 rehabilitated one-man cars.

Pittsburgh PCC 299 has brown leather seats.

Seats of TCRT PCCs are listed as having following material:

300-339	Green leather
340-389	Green Koroseal
390-439	Green leathergrain Koroseal

Cars 2004-2030 had aluminum arm rests on the aisle side of the transverse seats.

CURTAINS

All TCRT cars were originally equipped with brown curtains of woolen terry.

Green Pantasote curtains were placed in many rehabilitated cars from 1944 on, nearly 250 cars getting them finally.

GONGS

All standard cars were equipped with one 12" gong below car floor

In 1929 the company developed an air-operated gong, to be rung by a foot valve. None they could buy was satisfactory; the ones they made had all parts which could be affected by freezing, located above the floor line, with the gong still beneath the floor. The first one was installed in 2026 by August, 1929. Thereafter they were placed in all front exit and lightweight cars; and also in 5 old standard cars used on Robbinsdale, 1183, 1188, 1190-1192, in November, 1931.

WHISTLES

The first company-built cars had "peanut whistles". All now have deeptoned whistles. Several different types have been tried and used. 6-3-1910: ALL FAST CARS TO BE EQUIPPED WITH LONG DEEP-TONED WHISTLES.

A Westinghouse ~~pnewp~~ pneuphonic horn was installed in 1265 in January, 1931, and shortly after, in 23 more suburban cars: 1112-1113, 1115-1123, 1145-1146, 1160-1163, 1257, 1260-1264.

Whistles were mounted on the roof and operated by a pull-cord for right hand operation on all gatecars. They were moved for left hand operation on one-man cars, as the motorman had to keep his hand on the brake valve. In 1932 and 1933, foot levers for operating the whistle were installed in 2000-2030.

In 1930 24 suburban cars (numbers above, but prior to use of those horns) were equipped with an auxiliary air reservoir with restricted passage coupling for the whistle air supply, to reduce drop in air pressure just when stops were to be made.

TCRT PCCs have electric horns, in addition to the standard electric warning gong.

CAR HEATING

HOT WATER HEATERS

737-1290	Baker heaters
1291-1685	Peter Smith heaters
1686-1855	TCRT heaters
2000-2000A	TCRT heaters

These heaters were all located in the motorman's cab. Extra coal was kept in several buckets in the front cab, and supplies replenished from coal boxes at the ends of the lines. THE STOVES WERE CONNECTED TO HOT WATER PIPING IN THE BODY.

HOT AIR HEATERS

These were built and installed on cars rebuilt to front exit from 1920 to 1924. Stoves are located beneath the center of the car, with heat ducts along both sides of the interior, terminating in upright pipes behind the first longitudinal seat on each side. Stovepipe and chimney are on the gateside at the rear. Extra coal is carried in a large box beside the stove.

In these front exit cars, the resistors were set up in the front cab, in the spot formerly occupied by the hot water heater. During cool spring and autumn weather, ~~large win~~ the large bulkhead window behind the resistors was removed, so that this heat went back into the car. When the fire was started in the winter, and also during the summer, this window was replaced, so the resistor heat stayed up in the cab.

Fires are usually started around Nov. 1, and kept until early in April; they are not supposed to go out all winter.

These hot air heaters were retained (or newly installed) on ~~almost~~ all one-man cars not electrically heated. In these cars, the resistors were again moved beneath the cars, and the heat wasted. Electric strip heaters were installed on both platforms of these cars, on stanchions and as window defrosters. In 1932 and 1933, 20 strip heaters were put in each car, but this was soon reduced to 12, eliminating some from positions where passengers might be burned.

ELECTRIC HEAT

Trailers 200-225 were heated entirely by Chromolax strip heaters. Perhaps about the time of this rebuilding, 1613 was converted to electric heat; the resistor was placed in the stove, and its heat conveyed along the left side of the car. This was always considered a cold car.

Lightweights 2002-2030 and 1-4 were built with electric and resistor heating, and 2000-2001 was so equipped later.

The 64 cars rebuilt to front exit in 1928, 1254 and 1266-1328, were then given electric heating to replace the hot water cab stove. The resistors were enclosed beneath the car (forward) and their heat piped along the right side, with electric strip heaters beneath all the seats on the left side. The first standard one-man car, 1854, was also so equipped in 1931, as were 1129 and the six one-man Jackson St. cars, in 1932.

In Dec. 1931, the resistors under 1327 were moved to a center location, and their heat piped along both sides of the car, with additional electric heaters installed.

ELECTRIC HEATING (CONTINUED)

In 1931, automatic thermostatic control equipment was bought and installed for the electric heaters of 100 cars: #2-4, 1254, 1266-1328, 1613, 1854, 2000-2030. (Not installed in #1, 1129, or the Jackson cars). These thermostats were disconnected in the late 1930s, and removed in 1942.

Electric heat cars rebuilt to one-man, 1293-1328, have undoubtedly run up far more mileage than any other cars on the system, since many somewhat older cars were in limited service for years prior to rebuilding to one-man.

For most of their years, these electric heat standards have been assigned to East Side Station, since posts set between certain tracks prevent the firing of hot air system coal stoves in cars on those tracks.

Electric heaters replaced the Baker stove in double-end car 1230, probably sometime in the 1940s.

PCCs are heated chiefly by rheostat heat, with some auxiliary electric heat. Automatic thermostats are set for 55 degrees.

OIL HEAT

Two standard cars were experimentally equipped with oil heat in the fall of 1946 at Snelling Station. (These were 1731 & 1732, OR 1705 & 1706.) The oil burner was located where the coal stove had been, and control gadgets were placed beside the front fare box stand, where the motorman could adjust them without leaving the controls. Thermostats were installed. The fire would usually go out on the line, and the bugs in the system were never straightened out, so the cars were soon reconverted back to coal heat.

DESTINATION SIGNS.

The earliest standard cars had illuminated ~~cloth~~ glass sign in front deck roof window, white lettering on black background, and movable five-sided board signs on the sides of the roof. In 1901, new (4-3- white cloth signs, with black lettering, were installed in the front and both sides of the deck roof. Thirty or more readings were carried on each sign; these were supplemented when necessary with narrow wood or cardboard signs in the front center window. Beginning in 1949, some of these sign rolls for standard cars were made with white lettering on black cloth, which was in use on the lightweights and PCCs.

2000 and 2001 at first had white cloth signs set in the deck roof. Train cars 2002-2005 had sign boxes set up on the arch roof, as on these cars, the motorman was expected to stand, at least part of the time. 2006-2030, built with one-man service in view, when the motorman would be sitting all the time, had sign boxes set in the upper sash of the mirror window and the next to rear gateside window; 2000-2005 were so equipped in 1928.

1928- ~~In 1928~~, an illuminated numerical sign box, with Hunter sign mechanism, was set in the upper front window sash of 2024. This could show numbers from 1 to 999. With lines being relocated, many cars used only cardboard signs in the window; the numerical sign was intended to indicate route numbers. More were supposed to be made for the 2000s, but they were given up, and 2024's removed in a couple of months.

PCC 299, and some PCCs later transferred away from their original stations, had white cloth signs taken from standard cars.

FRONT VESTIBULE WINDOW CHANGES; MIRRORS; WINDOW WIPERS

All front vestibule windows were originally drop sash, on the standard cars. On the first ones built, the upper and lower sash were all in line, and proportionate in height to upper and lower sash all around the car.

In 1904 and 1905, all cars were equipped with an outside rear view mirror, to enable the motorman to watch passengers boarding and alighting through the rear gates. BEING INSTALLED MARCH 1905

Shortly after this, motormen, who had been required to stand at all times while driving, were permitted to sit down while on the outlying portions of their routes. In addition to installing seats for the motormen, the mirrors had to be lowered, and larger upper sash were required in the so-called "mirror windows". These were still drop sash. For comparison of proportions, car 1133: regular front windows, lower sash 24" high, upper sash 14 1/2"; new mirror window, lower sash 17", upper sash 22". These new mirror sash were probably first built in new car 1291 in 1908, but thereafter were also installed in the older cars. These were still drop sash.

The next change in the front windows was ~~first~~ made in 1928, when window wipers were first installed. These were hand-operated "Chinch" wipers. They were installed with what was termed a "one-piece" front window, a fixed two-panel window, the lower panel being 10" high and the upper 28". Mirrors were again lowered, and fixed mirror windows installed, of two glass panels corresponding in height to front windows. Apparently this work was first done on 7 train cars: 1609, 1614, 1616, 1617, 1618, 1623, 1625. In 1928 and 1929, 589 additional cars were done on one order:

The 583 remaining front exit cars; and suburban cars 1255, 1256, 1259, 1261, 1264, 1265.

Wiper installations and front sash changes were later authorized for the following groups of cars:

Early 1929, 20 more suburban cars: 1112-1113, 1115-1123, 1145, ~~1160-1164~~ 1160-1163, 1257, 1260, 1262-1263.

Mid-1929, 10 Jackson St. cars: 1124-1133.

Spring, 1930, 5 Robbinsdale cars 1183, 1188, 1190-1192.

Nov., 1932, Campus cars 1146-1149.

In 1930, earlier wipers were removed, and standard 24" Chinch wipers installed, with some front sash changes, in #1-4 and 2000-2030.

The next change was made in 1930 and 1931, with the installation of a sliding sash for ventilation in the small lower pane of the mirror window. Half this sash slid over against the other half, and through this motorman conversed with starters, inspectors, etc. The sample was installed in 1495 on 8-19-30, and thereafter in all 590 front exit cars, plus 27 suburban cars: 1112-1113, 1115-1123, 1145-1146, 1160-1163, 1255-1257, 1259-1265.

In cars rebuilt to one-man, this mirror window was displaced by the wide front doors, and at first the new mirror window consisted only of the original drop sash. New 3-part fixed mirror windows, with the center pane an inclined sash, were placed on the last 24 of 100 cars rebuilt to one-man in 1932. Thereafter this slant sash was installed in all cars later rebuilt, plus 151 cars done earlier: 1124-1129, 1131, 1293-1328, 1854, 2000-2030, and the other 76 cars of the 1932 order. The 24 cars done when rebuilt in 1932 were 1669, 1675, 1700, 1702, 1705, 1709, 1710, 1711, 1713, 1715, 1716, 1721, 1726, 1727, 1729, 1735, 1752, 1767, 1778, 1779, 1780, 1791, 1800, 1802. ---Correction: these 24 cars done in Nov. & Dec., ~~1932~~ 1932, after their rebuilding; other 151 cars equipped in 1933.

FIRST SLANT SASH IN 1805, 10-11-32.

GENERAL PAINT SCHEME

Following is company description of TCRT paint scheme, written in reply to a 1925 inquiry from the Market St.Ry:

Car body, chrome yellow
Gates and bumpers, dark green
Other trim, olive green
Roofs, Indian red

TROLLEY NOTES

In 1918 a trolley shoe was tested on at least one car, 1760, but was not found satisfactory.

Four-inch trolley wheels were used on the earlier cars, and at least through car 1265 and possibly higher. Then the company began to make its own seven-inch wheels and some of the older cars were equipped with these; Stillwater cars were being changed early in 1910. Some data sheets indicate cars back to 1007, at least, got the 7-inch wheels. 7" WHEELS FOR EASE IN BACKING

In season, ice scrapers are carried in the cars, to be fitted around the trolley wheel to break ice off the wires.

Retrievers were being put on cars in 1914, if not earlier; some 1200s and 1300s were getting them then. This note seems to conflict with following: Aug. 9, 1916, all cars when at shops were being equipped with snap at end of trolley rope, and eye on post at rear of gates. Rope to be run through eye and attached to snap, allowing rope to hang in loop from eye. Some conductors attached rope to brass window guards with "dire results" to said window guards when trolley left wire.

In 1927, Knutson retrievers were being put on cars, with retrievers ordered for many 1000s, but not for some 1100s or 1200s. (At this same time, stool sockets were being put in all 1000s and 1100s.)

Final retriever installations were made in July, 1929, on regular Bryn Mawr cars 985-990.

All TCRT PCCs have trolley catchers instead of retrievers.

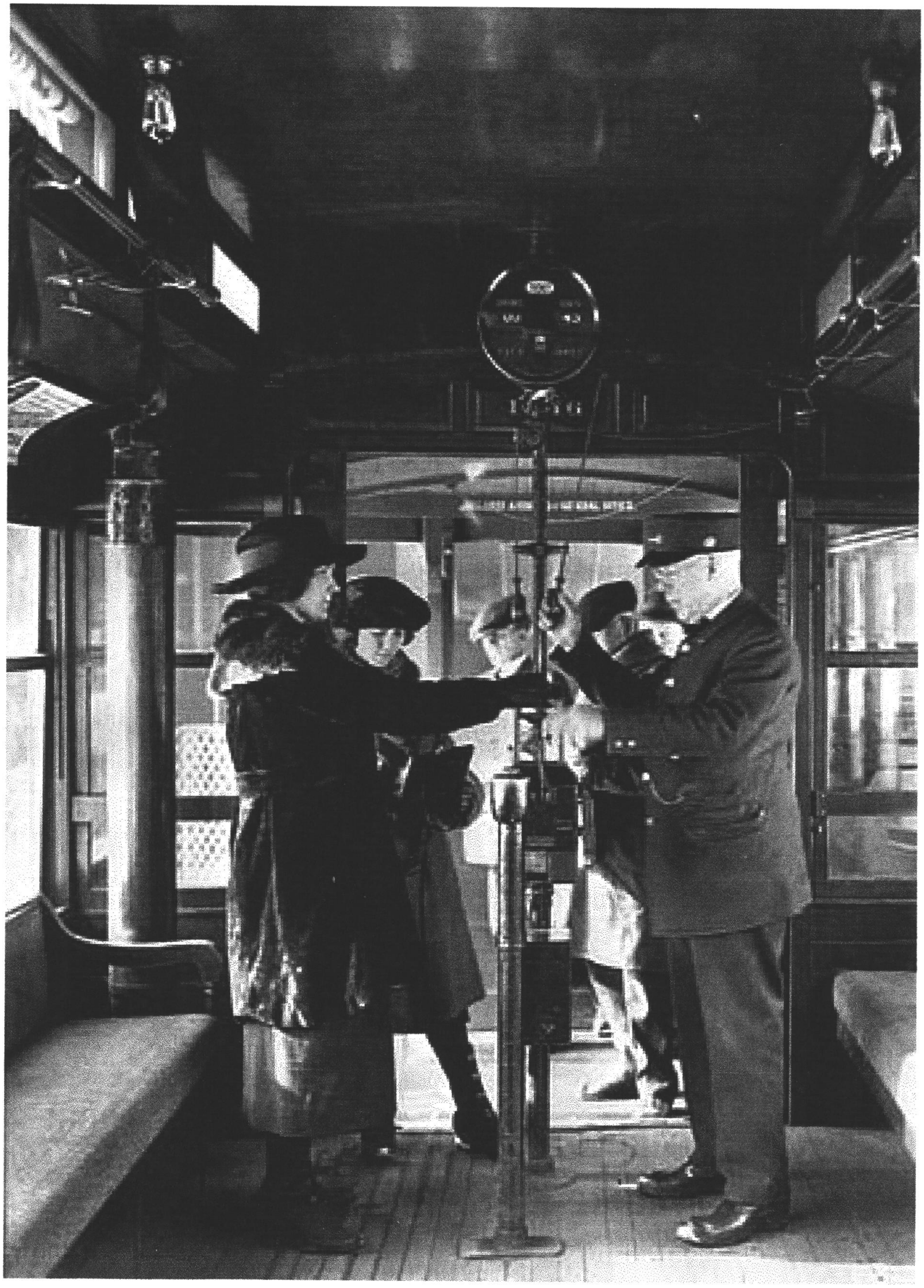
COASTING TIME RECORDERS

These were used for some time and provided records of actual amount of coasting done by individual motormen (this affecting power consumption). For example, in Dec., 1917, all the cars at Nicollet Station were equipped with coasting time recorders.

FARE REGISTERS AND FAREBOXES

Fare registers were originally mounted in the front of the car, in view of everyone, with cords running the length of the car. Later they were moved to the rear, perhaps about 1918 when fareboxes were installed and the pay as you enter system was being adopted line by line. For some time, conductors had to continue ringing fares on the register even while the farebox was in use. Disused for many years, registers were finally removed from all except the Inter Campus cars, in 1938 (removed from 733 cars, left in cars 1146-1149). Also in 1938, pipe railings and posts, for conductor's support or back rest, were removed from the rear platforms of 2000-2030.

For PAYE fast rush hour operation on Mahtomedi, fare box stands were placed in 1116, 1117, 1119, 1257, 1260-1263 in 1932; using stands removed from cars 780, 802, 816, 866, 867, 878, 891, 901. (Note: original intention was to equip 1257 and 1259-1265 with fareboxes. On cars that were done, two seats were removed from rear pole side.)



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FAREBOXES (CONTINUED)

Only Johnson manual fareboxes have been used on TCRT streetcars. These at first had "open tops" which would take an assortment of coins. Such a farebox was used on the Minneapolis Filtration Plant car. These~~x~~ received and counted dimes, nickels, pennies, and tokens.

Having got a single-coin fare in 1929 (a dime or a token), the company in 1930 and 1931 rebuilt most of its fareboxes, substituting closed tops with slots. 900 fareboxes for local service would take only dimes or tokens; these boxes were painted black. 80 fareboxes for suburban service would take nickels or pennies in the top center slot; these boxes were painted red, and ~~would~~ were used on Hopkins, St. Louis Park, Mahtomedi cars. Robbinsdale cars, with the 3¢ extra fare collected there, had red boxes retaining the old "open top" on which many coins could be thrown. After the 11¢ city fare was ~~xx~~ granted in 1948, all fare box tops were again changed back to the open type.

INTERIOR LIGHTING

The older standard cars had 36-watt Mazda bulbs, and these were retained in 1136 till that car was scrapped.

Later standard cars and the lightweights used 23-watt bulbs. These were retained for all time in the front exit gatecars and in cars 1-4. These bulbs were of clear glass.

On gatecars these were arranged in four series. There was a series of five lights each along each side of the car, one light on each second window post from the front, providing what amounted to individual seat lights for each double seat. One series was of two lights illuminating each side sign, and one light above the front steps. The final series was of two lights illuminating the front sign, one above the fare box, and two on the rear platform. Gatecars had 94-watt headlights and 8-watt taillights (but see earlier notes on this) The 2000s had 23-watt lamps in the body and sign boxes, 72-watt headligh The above arrangements were not at first changed in one-man cars.

Early in 1932 new lighting arrangements were made in 1327. This car was given 9 56-watt lamps in the car body and a 56-watt headlight. Cars rebuilt in 1932 were made to conform to this pattern, and the earlier one-man cars were also so changed. The 2000s rebuilt in 1932 also got 10 56-watt bulbs; one headlight, one in front sign box, seven in car body and one on rear platform. Holophane shade reflectors and shade holders were put on all bulbs in these cars; in the 2000s, they replaced older ornamental light boxes, several types of which had been used. (Actually one-man cars got 8 car body lights and one light in "Enter Here" sign,~~x~~ and 10-watt farebox and taillights.

The standard one-man car lighting was changed again in 1937, 534 cars being changed by 1939. 56-watt lamps were kept in the car, arranged in two series, four lights each (alternate lights on opposite series); these two series connected with 94-watt headlight, which dims if either series goes out. An additional circuit of 5 15-watt bulbs was installed, one for the farebox, one for the taillight, three in the "Enter" sign. At this time all light shades were removed from the cars.

In 1945, along with its PCC interior, 1441 had an extra series of 5 ceiling lights installed; and the same year, 1246 got an extra series of 6 lights. These glow slightly dimmer than the lights on the other series, with which they are alternated in the ceiling.

TAIL-LIGHTS

In the early years of electric operation, red lanterns were hung on the rear of the cars at night, and men were stationed at downtown corners to put these on the cars.

In June, 1911, electric tail-lights were being put on the cars, and these were put on all standard cars. ~~Thxs~~ These operated from batteries and were used for many years.

An Edison storage battery was tried out in the taillight of 1495 at East Side on 8-10-30; it was removed 2-11-34 and installed in 1272 for the rest of the year.

Tests:

Tail-light reflector on 1439 at Snelling, 12-29-35.

Reflecting tail-light lens on 1533 at Nicollet, 1-29-37.

New type reflector tail-lights on 1703 and 1786 at Lake St., 8-11-37; a note from Mr. Barnes to Mr. Bjorck said that these cars could be run on Fort Snelling at any time so that he could inspect these at his convenience. These reflector tail-lights were authorized for 722 cars in Oct., 1937, all installed by Oct., 1938, tail-light batteries being then removed. These 722 cars included all cars maintained for service then, including 1137-1138 (Jackson St. spares), 1146-1149, 1-4, the 5 double-end 800s, etc.

In 1927, an air-operated stop sign was tried on 1391 at North Side, but was removed.

INTERIOR LIGHTING NOTE FOR Jan., 1911.

658 cars in service had carbon arc lamps inside. First installation of 16 tantalum lamps was made in new car 1388; other cars were then equipped.

HEAD-LIGHTS

Many different types of head-lights have been used. Around 1910, enough cars were being fitted with arc headlights for night run cars on all lines to have them. Arc headlights remained in use the longest on the suburban cars. Many headlights were made by the company. New yellow headlights were first being installed in Dec., 1920. HOLTS. WERE ORIGINALLY CARBON ARC; WHEN FRONT EXIT CARS WERE BEING REBUILT IN 1920, THE ELECTRIC INCANDESCANT TYPE WERE INSTALLED. TYPES USED: LUMINOUS ARC; WAGENHAL'S; CROUSE-HINDS; DAYTONS, INC.; GOLDEN GLOW.

CONDUCTOR BELLS

These were of 4 1/8" diameter and were installed on ~~all~~ front and rear platforms of all standard cars.

PASSENGER SIGNALS

Electric push buttons, 28 in most ~~cars~~ gatecars; button on each window post in the car, and four on rear platform.

Electric buzzer

Electric buzzer

ONE-MAN CAR SCRAPERS

AIR-OPERATED WINDOW WIPERS

Tests:	1637	7-25-41	L.S.	Air Push
	1293	7-25-41	E.S.	Trico Folberth
	1611	8- 7-41	N.S.	" "
	1833	8- 7-41	Dul.	Air Push

Installed in Oct. & Nov., 1942:

1838	Nic	1578	N.S.	1710	L.S.
1762	Dul	1167	E.S.	1812	Snell.

On Feb. 2, 1944, work was authorized to install Air Push wipers and remove Chinch wipers on 18 snow plows and the 702 regular passenger cars: 1-4, 1146-1149, 1166-1254, 1266-1854, 2000-2030 (minus several cars scrapped). At the same time, the passenger cars had sun visors installed inside the front windows.

SANDERS

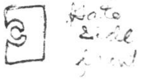
Gatecar sanders were located in the front cab. These worked by a knee-operated lever, and sanded the right rail only. One-man cars have air-operated sanders for both rails, controlled by a foot pedal, with the sand in boxes beneath the front longitudinal seats. PCCs have electrically operated sanders for both rails, with hammers operating automatically to start the sand on its way.

SCRAPERS

The very earliest Twin City electric cars had manually-operated scrapers or plows for each rail. Air-operated scrapers were first installed on the 64 front-exit cars of the 1254 group when rebuilt in 1928, and were afterwards installed on all one-man cars. All scrapers were removed and sold for scrap in 1950.

SWITCHING

All cars built by TCRT had front-platform ~~switchholes~~ switch-holes for throwing switches without leaving the car. Gatecars had a single very long switch-rod hung in the front cab, and a short switch-rod kept on the rear platform for the conductor's use. One-man cars long switch-rods set in wedge-shaped holders in the switch-holes, on both sides, plus the short switch rod, kept up in front, IN A HOLDER



BROOMS

Standard cars are equipped with yellow-handled brooms set in a holder near the conductor's position. At Lake St. Station the broom handles were usually peeling, from being used to prop open the switch box so that the motorman could get at the light switch easily near the Selby tunnel. PCCs have brooms with green handles, to go with the interior color scheme; but with the general disintegration of the rail system, in 1953, yellow-handled brooms could sometimes be found in PCCs.

EXTRA EQUIPMENT

Among other equipment found on all TCRT cars, these may be mentioned: big coal shovel, ice scraper for the steps, camelback, wire pickup rig for picking up broken overhead wire (included in PCC equipment), spare trolley pole on roof.

MINOR MISCELLANEOUS NOTES

TCL EMBLEM NOTES

--Emblem added to right side of 299 about August, 1948.

--18 lightweights in all got emblems: 1 2 4 2000 2002 2003 2006 2007 2009 2010 2011 2018 2020 2022 2024 2025 2026 2028. 2026 had pole side emblem painted out in 1950.

--Notes on 287 standard steel-side cars: 1166 got emblem on gate side only. 1757 presumably got both emblems, but lost GS emblem when section of steel plate was replaced; however, Rusterholz though it never had got GS emblem. --In all, 49 steel cars never got any emblems:

1945 cars: 1224 1247 1385 1420 1485 1501 1503 1505 1540 1608
1704 1778 1800

1946 cars: 1197 1201 1203 1207 1208 1210 1211 1215 1217 1218
1294 1302 1304 1311 1318 1328 1398 1495 1517 1611
1637 1695 1713 1729 1746 1785 1817 1819 1831 1833

1947 cars: 1185 1487 1491 1709 1762

1944 car : 1834

"SMALL NUMBERS" -- "SQUEEZED TOGETHER"

--Includes 1230 from '47 or '48 rehab

--Includes all emblem cars, and other rehabs from Sept. 10 1947.

--Includes most repainted cars or sides of cars.

"LARGE NUMBERS" -- never squeezed up. "R" "L",right or left side large

--The 2000s without emblems:

2001 2004 2005 2008R 2012 2013L 2014 2015 2016 2017 2019
2021 2023 2027 2029L 2030 (3 cars "touched up" in 1950-51.)

--1136 always retained "large numbers".

--All cars scrapped through 1948.

--Of 125 gatecars left 1949, these retained large numbers: all lists checked and all painting accounted for: 77 cars with large nos:

1254 1266R 1267 1268 1270 1272 1273 1274R 1277 1278
1279 1280 1281 1282 1283 1285 1287 1290 1291 1292
1333 1335 1336 1337 1338 1339 1340 1341 1343 1344
1345 1346 1347 1348 1351 1352 1355 1356 1358 1360
1366 1369 1371 1373 1378 1379 1380 1383 1399 1400
1403 1405 1406 1409 1411 1412 1413 1416 1418 1421
1422 1423 1426 1431 1432 1435 1438 1442 1443 1444
1452 1458 1471 1476 1493 1514 1547

--Steel-side non-emblem cars listed above all retained large numbers, all checked off, except note these:

1166 PS large (GS emblem)
1197 GS large (PS painted, with new front end 1949)

--Wood-side cars; following retained "large numbers", final list checked, and painting all accounted for: Patch-up painting on record for all cars with one side painted, except 1189 GS & touch-up noted Feb. '52. Following are double-checked list of wood cars with large numbers:

1945 cars: 1226 1228
1233L 1236 1240L 1393L 1448 1464R 1510R 1525R 1532L 1820R

1946 cars: 1186R 1188
1190L 1206 1213R 1214R 1216 1225 1238 1293 1295 1296
1297 1298 1299 1303 1313 1316L 1323 1734 1192 1195

1947 cars:
1168 1169R 1170 1171 1172 1173 1174 1175 1177 1178
1180 1181 1182 1184 1189L 1191R 1193 1196 1301 1306
1309 1310 1314 1319 1324 1522 1578 1654 1690 1693
1741 1765 1774 1786 1789 1792 1798 1812 1846

GREEN PLASTIC (SARAN) SEATS -- resembling rattan, smaller weave
18 CARS -- *Starred cars changed to newer Koroseal seats later.

1166*	5- 3-47
1408	9-18-45
1415*	12-23-44
1446*	1-11-45
1454	8-17-45
1466*	6- 7-44
1485	10-17-45
1492	12-14-44
1501	3- 6-45
1577	9- 8-45
1587#	8-25-45
1618#	3-23-45
1656	10-10-45
1669	4-13-45
1675q	11-30-45
1707	6-22-44
1747	12-20-45
1749*	5-28-45

#1587 2-51 recoat, seat-backs new Koroseal
#1618 3-51 recoat, Saran and new Koroseal mixed
q1675 10-50 recoat, yellow rattan seats again

GREEN PANTASOTE SEAT COVERS -- smooth, very shiny when worn
15 CARS -- *Starred cars changed to newer Koroseal seats later.

1203	6-19-46
1208	6-26-46
1243*	10-17-45
1312	10- 1-47
1441	8- 1-45
1505	11- 1-45
1611	6-26-46
1615*	1-21-44
1709	3-11-47
1716	7- 7-45
1727	2-24-44
1745#	4-22-44
1780	11-17-45
1797	10-24-47
1817	7-23-46

#1745 11-18-49 rehab, mixed, one side old,one Koroseal

YELLOW PLASTIC SEATS (or different grade rattan?) - smaal weave - bright
(Part of list only, recorded at the time for "samplex cars")

1588	7-15-48
1668	-48
1678	12- 8-47
1695	10- 3-46
1734	9-25-46

1301 . (PHOTO)

GREEN KOROSEAL SEATS (as in PCCs)
65 CARS - first car 1768 - "rc" indicates recoat car, not rehabilitated

1166	4- -50 rc, after fire
1187	2- 9-49
1243	8- -51 rc
1389	10- -50 rc
1390	2- 3-50
1415	12-23-49
1446	4- -50 rc
1466	10-26-49
1470	3- 4-49
1506	12- 2-49
1521	12-14-49
1529	10-14-49
1530	3-15-49
1535	10-26-49
1536	6- 6-49
1541	12-23-49
1554	8-29-49
1581	12-14-49
1601	11- -51 rc
1615	3-24-49
1620	6-19-49
1627	10-26-49
1630	5- 4-49
1632	8-16-49
1634	1- 9-50
1635	5-16-49
1636	5- 4-49
1648	1- 9-50
1650	4-22-49
1652	10- 4-49
1653	6-16-49
1664	10-20-48
1667	1-17-49
1673	2-23-49
1677	10- 8-49
1681	9-22-49
1685	2- 9-49
1689	1- 4-49
1694	11-12-48
1698	12-23-48
1719	10-20-48
1724	1-17-49
1725	11- 7-49
1732	12-10-48
1738	9- -50 rc
1739	11-26-48
1742	11- 1-48
1743	3-24-49
1749	1-24-50
1750	5-25-49
1759	11-26-48
1764	9-16-48
1768	8-19-48
1769	4-13-49
1772	1-28-49
1801	6-27-49
1803	3- -51 rc
1821	8- 3-49
1824	12-23-48
1825	9-28-48
1827	4- 4-49
1837	1-24-50
1839	9-23-48
1840	3- 6-50
1849	10- 8-48

SCREEN AND WINDOW GUARD NOTES

It was perhaps to screens on the 2000s that "Interurbans" referred when it said window guards were hinged at the bottom, and could just be dropped down for car washing, rather than entirely removed. --There was a single-window screen on 2000s by the passenger seat on the front platform. The rest consisted of a center section of connected screens for five windows, between two end sections each connected for four windows. There were also some sort of grill attached to the screens, for which I didn't know the purpose; they were not as high as the screens, and each ~~car~~ car had from two to six or seven of these.

FIRST WINDOW GUARDS

Supposedly first ones were in 1731 and 1803 on 9-4-45.

--This solves problem in my "TCRT SHOP RECORDS" of correct year for rehab. of 1731, which I had surmised was 1945 followed by Green's 1950 recoat. It apparently went into the shop with 1209 1249 1587, group done Aug. 25; but unlike those, ceiling was not painted all white. 1731 must have been held off by itself while getting window guards. Second car, 1803, is OK is regular Aug. 31 rehabilitation group.

--Was this about the time automatic washer was installed on 6 track at Snelling?

SNELLING CARS

--Of the wartime cars, 1211 had been transferred earlier, and never got window guards.

--~~1629 must have got its window guards as Snelling car rehabbed 12-5-44 But~~ 1611 would get them in 46 as an N.S. car again.

--When I studented at Snelling in 1946, it seemed most of their cars, but not all, had window guards. My check on window guards started Sept. 1948, and all Snelling cars then had them, so probably most of the installations were made ~~at~~ at other than rehabilitation dates.

NORTH SIDE CARS

**I had a notion that 1611 (6-26-46 rehab) was first N.S. car with window guards. Washer was probably to be put in at N.S. at about that time. At N.S. also, new installations were made at other than rehabilitation dates, and from Sept. 1948 few actual changes could be noted. New guards went on rehabs 1664 ~~1-20~~ 10-20-48, 1665 11-26-48, 1683 2-9-49. Other rehabs ~~dur~~ during those months had already had window guards. Also new: 1805 4-4-49, 1791 5-16-49. This completed N.S. installations, all their original cars equipped except two 1945 cars, 1198 and 1389, which never got window guards. 1590 done for NS 9-22-49.

N.S. 1575, sent to Lake Aug. 1947, never got window guards.

NICOLLET CARS

--I do not know when washer was installed at Nicollet.

--Four 1944 cars 1626 1644 1649 1658 were equipped at unknown time, prior to Sept 1948, not during rehabilitation. Otherwise all Nicollet cars so equipped were done only during rehabilitation. 1838 must have got them in 9-22-47 rehab. Then when N.S. work is nearly done, shops began equipping all Nicollet cars that they rehabbed, commencing with 1847 on 6-11-48. (Also old Nic, 1801 to N.S. '47, had WG 9-48, not received in rehab.

LAKE ST. CARS

**Only one done during rehab, 1787 12-18-47, which I surmised was done because car was sent in from North Side.--In 1948, N.S. 1470 was transferred to Lake with window guards, and in its 3-4-49 rehab, the shops restored it to screens status. But with June 1951 recoat, Green gave it back its window guards. ---Green put washer in at Lake in Aug. 1950. 16 of his and Ossanna's 50-51 recoats got window guards, some N.S. Lake & Nic. --Guards were never put in a car when it belonged to ES or ~~D~~ Duluth.

FULL LIST OF 237 CARS WITH WINDOW GUARDS

"g" - installed '50 or '51 in recoat cars

Station originally installed for:

Sn - Snell   no - No. Side   nic - Nicollet   LS - Lake St.

1172 no
1173 no
1174 no
1175 no
1176 no
1194 nic
1197 no
1199 no
1200 no
1201 no
1213 Sn
1214 Sn
1222 no
1224 Sn
1225 Sn
1226 Sn
1228 Sn
1229 Sn
g1250 nic
g1382 LS
1384 no
g1385 LS
1386 no
1387 no
1388 no
1390 no
1392 no
1394 no
1395 no
1396 no
1397 no
g1417 LS
g1424 LS
g1430 LS
1465 Sn
1466 Sn
1467 Sn
1469 Sn
1470 Sn
g1470 LS

1473 Sn
1475 Sn
1479 Sn
1480 no
1487 Sn
1490 Sn
1491 Sn
1494 Sn
1495 Sn
1496 Sn
g1497 LS
1498 Sn
1499 No
1500 Sn
1502 Sn
1503 Sn
1504 Sn
1505 Sn
1506 Sn
1507 Sn
1508 Sn
1509 Sn
1510 Sn
1511 Sn
1512 Sn
1513 Sn
1515 Sn
1516 Sn
1517 Sn
1518 Sn
1523 Sn
1525 Sn
1526 Sn
1532 Sn
1533 nic
1535 Sn
1536 Sn
1537 no
1539 nic
1540 Sn

1541 Sn
1544 nic
1546 nic
1548 nic
1549 nic
1552 nic
1554 Sn
1558 nic
1559 nic
1560 nic
1564 nic
1566 no
1567 no
1568 nic
1570 nic
1572 nic
1573 nic
1574 nic
1576 nic
g1577 no
1578 no
1579 no
1580 no
1581 no
1582 no
1583 no
1584 no
1585 nic
1586 no
1587 no
1588 no
1589 no
1590 no
1591 no
1593 no
1594 no
1595 nic
1596 no
1597 no
1599 Sn

1600 nic
g1601 nic
1602 nic
1603 nic
1605 nic
g1606 nic
1607 nic
1609 no ?
1611 no
1625 nic
1626 nic
1632 nic
1638 nic
1640 nic
1641 nic
1643 nic
1644 nic
1645 nic
1646 nic
1649 nic
1654 no
1655 no
g1657 nic
1658 nic
1660 nic
1661 nic
1663 no
1664 no
1665 no
1666 no
1667 no
1668 no
1669 no
1670 no
1673 no
1675 no
1676 no
1677 no
1678 no
1683 no

g1684 nic
1688 nic
g1696 LS
1700 no
1705 Sn
1706 Sn
1707 Sn
1708 Sn
1712 Sn
1714 Sn
1715 Sn
1716 Sn
1718 Sn
1730 Sn
1731 Sn
1732 Sn
1733 Sn
1735 nic
1736 Sn
1738 Sn
1740 Sn
1741 Sn
1742 Sn
1744 nic
1745 Sn
1747 Sn
1748 Sn
1753 nic
1756 Sn
1757 Sn
1759 nic
1763 Sn
1764 Sn
1767 nic
1769 Sn
1775 Sn
g1778 nic
1780 no
1781 Sn
1787 LS

1791 no
1793 Sn
1794 Sn
1795 nic
1796 Sn
1800 no
1801 ~~no~~ nic
1802 no
1803 Sn
1804 nic
1805 no
1806 no
1807 no
g1808 nic
1809 Sn
1810 Sn
1811 Sn
1812 Sn
1813 Sn
1814 Sn
1815 Sn
1816 no
1820 no
1821 Sn
1822 Sn
1823 nic
1824 nic
1825 Sn
1827 nic
1828 nic
1832 Sn
1838 nic
1840 Sn
1842 Sn
1845 Sn
1846 Sn
1847 nic
1853 Sn

NOTES ON BUMPERS

--Years given are time by which I had noted condition of bumper. In most cases, changes would have been made at earlier rebuildings.

--Rear bumper anti-climbers were presumably put on new cars 1291 and up from 1908 onward, although 1291 itself is recorded without it. (Old Snelling picture of 1309 does not show 1309's rear, but cars on same track have no a/c's; 1419 certainly had one when new.)

--On list below, assume anti-climber on all rear bumpers unless they are marked "no a/c".

--Front bumper anti-climbers presumably first tried on electric-heat cars rebuilt 1928, as in picture of 1274; this would add to streamlined appearance, as did new metal skirts on those cars. But not all those 64 cars got front anti-climbers then.

--When record below shows front bumper "cut" off, assume there is an anti-climber, unless record says "no a/c". No a/c's on full bumper.

--"Cut" front or rear bumper indicates removal of section as wide as two windows. "1/2 cut" means removal of section as wide as one window. Separate column shows "cut" of section of bumper By front exit door.

--Front bumper "1/2 cut" would have no a/c.

EARLY NOTES

By Door			Front Bumper	Rear Bumper
	42	# 96	Full	Full, no a/c
	40	1230	Full	Full, no a/c
	40	1254	Cut	Full, no a/c
	40	1266	cut	cut
	40	1268	full	full, no a/c
	40	1269	cut	cut
	40	1270	cut	cut
	40	1271	cut	cut
	40	1272	cut	cut
	40	1273	cut	cut
	40	1274	cut	cut
	40	1277	cut	cut
	40	1278	full	cut
	40	1279	full	full, no a/c
(41 rehab.no chg.)				
	40	1280	cut	cut
	42	1281	cut	cut
	40	1282	cut	cut
	40	1283	cut	cut
	40	1284	cut	full, no a/c
	40	1285	full	full, no a/c
cut	42	1285	cut	full
	40	1286	full	full, no a/c
cut	42	1286	cut	full

FINAL CONDITION

By Door			Front Bumper	Rear Bumper
	46	# 95	Full	Full, no a/c
	50	# 96	Full	Cut, no a/c
(#96 striped black & silver)				
	42	1136	Full	Full, no a/c
Prob. cut	42	1230 "	Both front ends: cut	
	41	1254	cut	cut
cut	42	1266	cut	cut
cut	42	1267	cut	cut
cut	41	1268	cut	cut
cut	42	1269	cut	cut
cut	46	1270	cut	cut
cut	46	1271	cut	cut
cut	42	1272	cut	cut
cut	47	1273	cut	cut
cut	42	1274	cut	cut
	40	1275	cut	cut
	40	1276	cut	cut
cut	46	1277	cut	cut
cut	42	1278	cut	cut
cut	46	1279	cut	cut
cut	46	1280	cut	cut
cut	46	1281	cut	cut
cut	46	1282	cut	cut
cut	47	1283	cut	cut
cut	46	1284	cut	cut
cut	47	1285	cut	cut
cut	46	1286	cut	cut

NOTES ON BUMPERS

EARLY NOTES

By Door		Front Bumper	Rear Bumper
40	1287	full	full, no a/c
42	1287	full	cut
40	1288	cut	full, no a/c
40	1289	full	full, no a/c
40	1290	full	full, no a/c
40	1291	cut	full, no a/c
40	1329	cut	full
40	1330	full	full
40	1332	full	full
40	1333	full	full
40	1334	full	full
40	1336	full	full
40	1337	full	full
40	1338	full	full
40	1339	full	full
40	1340	cut	full
40	1341	cut	full
40	1342	full	full
40	1343	full	cut
40	1344	full	full
40	1345	full	full
41	1345	full	cut
40	1347	cut	full
cut 41	1346	cut	full
40	1349	full	full
40	1350	cut	full
40	1351	full	full
42	1352	full	full
40	1355	full	full
40	1356	cut	cut
40	1357	full	full
40	1358	full	full
40	1359	full	full
~~40~~	~~1360~~	~~cut~~	~~cut~~
40	1360	full	full
42	1360	cut	cut
40	1353	full	full

FINAL CONDITION

By Door		Front Bumper	Rear Bumper
cut 47	1287	cut	cut
cut 46	1288	cut	cut
cut 42	1289	cut	1/2 cut, no a/c
cut 41	1290	cut	cut
cut 41	1291	cut	cut
40	1292	cut	cut
cut 42	1329	cut	full
cut 46	1330	cut	cut
40	1331	full	full
cut 42	1332	cut	full
42	1333	1/2 cut, ~~no a/c~~	full
cut 46	1334	cut	cut
42	1335	full	full
cut 42	1336	cut	full
cut 42	1337	cut	full
42	1338	full	cut
42	1339	1/2 cut, ~~no a/c~~	full
cut 46	1340	cut	cut
46	1341	cut	cut
41	1342	full	cut
cut 46	1343	cut	cut
cut 46	1344	cut	cut
47	1345	cut, no a/c	cut
41	1347	cut	cut
cut 47	1346	cut	cut
42	1348	cut	full--49 both cut
cut 41	1349	cut	full
cut 47	# 97	cut	cut
cut 46	1350	cut	full
cut 41	1351	cut	cut
cut 46	1352	cut	cut
~~42~~	~~1353~~	~~full~~	~~full~~
40	1354	full	full
47	1355	cut, no a/c	full
cut 42	1356	cut	cut
cut 46	1357	cut	cut
41	1358	full	cut
cut 42	1359	cut	cut
cut 46	1360	cut	cut
42	1353	1/2 cut	cut

NOTES ON BUMPERS

EARLY NOTES By Door		Front Bumper	Rear Bumper	FINAL CONDITION By Door		Front Bumper	Rear Bumper
40	1361	cut	full	cut 46	1361	cut	cut
?	1362	full	full				
41	1362	cut	full	cut 42	1362	cut	cut
40	1363	full	full	42	1363	full	cut
37	1364	cut	full	*			
41	1364	cut	cut	cut 46	1364	cut	cut
37	1365	full	full	cut 42	1365	cut	full
40	1366	full	full	47	1366	full	cut
37	1367	full	full	cut 46	1367	cut	cut
40	1368	full	full	41	1368	full	cut
40	1369	full	cut	cut 46	1369	cut	cut
37	1370	full	full	41	1370	full	cut
37	1371	cut	full	cut 46	1371	cut	cut
37	1372	full	full	cut 41	1372	cut	cut
37	1373	cut	full	cut 46	1373	cut	cut
				40	1374	full	full
37	1375	full	full	cut 46	1375	cut	cut
				cut 41	1376	cut	cut
40	1377	cut	cut	cut 46	1377	cut	cut
37	1378	full	full				
40	1378	cut	full	cut 47	1378	cut	full
37	1379	full	cut	cut 42	1379	cut	cut
37	1380	full	full	cut 41	1380	cut	cut
~~37~~				37	1381	full	cut
37	1383	full	full				
41	1383	full	cut	cut 47	1383	cut	cut
37	1399	full	full	cut 46	1399	cut	cut
37	1400	full	full				
40	1400	cut	cut	cut 41	1400	cut	cut
				37	1401	cut	full
40	1403	cut	full	cut 42	1403	cut	cut
40	1404	cut	cut	cut 46	1404	cut	cut
40	1405	full	full	41	1405	full	cut
				40	1406	full	cut
40	1407	cut	full	cut 42	1407	cut	cut
40	1409	full	full				
41	1409	full	cut	46	1409	cut, no a/c	cut
40	1410	full	full	42	1410	full	cut
41	1411	cut, 1/2, ~~has a/c~~	full	42	1411	1/2 cut, ~~has a/c~~	cut
40	1412	cut	full	cut 46	1412	cut	cut
40	1413	cut	cut	cut 42	1413	cut	cut
40	1414	full	full	cut 42	1414	cut	cut
				cut 42	1416	cut	cut
40	1418	full	full				
41	1418	full	cut	cut 47	1418	cut	cut
41	1419	cut	full	cut 42	1419	cut	cut
40	1421	cut	full				
41	1421	cut	cut	cut 42	1421	cut	cut
40	1422	cut	full	cut 41	1422	cut	cut
40	1423	cut	full	cut 41	1423	cut	cut
40	1426	full	full				
41	1426	cut	cut	cut 42	1426	cut	cut

NOTES ON BUMPERS

EARLY NOTES

By Door			Front Bumper	Rear Bumper
	40	1427	full	full
	40	1428	full	full
cut	41	1431	cut	full
	40	1432	full	full
	40	1434	full	full
	40	1435	full	cut
	40	1436	cut	full
	40	1438	full	full
	42	1439	full	full
	37	1443	full	full
	41	1444	full	full
	37	1445	cut	cut
	37	1447	full	full
	40	1453	cut	full
	41	1455	full	cut
	37	1457	full	full
	40	1458	cut	full
	40	1458	cut	cut
	40	1459	full	full
	40	1460	cut	cut
	40	1463	full	full
	42	1471	cut	1/2 cut
	42	1472	full	full
	40	1476	full	full
	40	1477	full	full
	40	1478	cut	full
	40	1481	full	full
	40	1483	full	full
	40	1484	full	cut
	42	1487	full	full
	39	1490	cut	cut
	39	1491	full	cut
	40	1491	cut	cut
	40	1500	full	full
	39	1514	full	full
	40	1514	cut	full
cut	41	1514	cut	full
	40	1516	full	cut
	37	1542	cut	cut
	37	1547	cut	cut
	37	1563	full	full
	40	1854	full, no a/c	cut

FINAL CONDITION

By Door			Front Bumper	Rear Bumper
	41	1427	full	cut
cut	41	1428	cut	cut
	40	1429	cut	cut
cut	46	1431	cut	cut
	42	1432	full	cut
cut	41	1434	cut	full
cut	46	1435	cut	cut
cut	42	1436	cut	cut
	41	1438	full	cut
cut	46	1439	cut	cut
	37	1442	cut	cut
cut	41	1443	cut	cut
	42	1444	full	cut
cut	42	1445	cut	cut
cut	41	1447	cut	cut
	40	1452	cut	full
	41	1453	cut	cut
cut	46	1455	cut	cut
	40	1456	full	cut
	41	1457	full	cut
cut	42	1458	cut	cut
cut	42	1459	cut	full
cut	42	1460	cut	cut
	40	1461	full	full
cut	41	1463	cut	full
cut	46	1471	cut	1/2 cut
cut	46	1472	cut	cut
	42	1474	full	cut
	41	1476	full	cut
	41	1477	full	cut
cut	42	1478	cut	cut
cut	42	1481	cut	full
cut	41	1483	cut	cut
	42	1484	1/2 cut, no a/c	cut
cut	42	1486	cut	cut
	42	1487	1-man	
	42	1490	1-man	
	42	1491	1-man	
	40	1493	full	cut
	42	1500	1-man	
cut	46	1514	cut	cut
	42	1516	1-man	
cut	42	1542	cut, no a/c	cut
cut	46	1547	cut	cut
	40	1555	cut	cut
cut	46	1563	cut	cut
	42	1854	normal steel car	

MINOR MISCELLANEOUS NOTES

DECK ROOF VENTILATORS. Deck roof windows counted from front.
875 photo. GS: 2-4-9-10 (sign in windows 8-9).
825 photo. GS: 2-4-11-12 (sign in windows 9-10). Postition of ventilators no doubt governed position in which ~~pax~~ roll signs were installed in 700s and 800s several years after the cars were built.
900 up, roll signs in windows 10-11.
VENTILATORS IN 1136 AND 1230: All brass handle vents:
GS: 2-4-9-12. PS: 9-12 only.
VENTILATORS IN #96 (ex-1261):
Both sides: 2-4-7-9-11. All brass handle vents.
LATER 1200s: & CARS TO 1506: BRASS HANDLE VENTILATORS.
GS: 2-4-9-12. PS: 2-9-12.
SHOP ORDER of early 1929: INSTALL four automatic ventilators (as in 1507), to draw moist air from car and prevent front windows ~~fxxx~~ from getting frosted. (These "automatic" ones could be hooked shut but apparently were supposed to be left alone.) Retire "4 Brass Transom Turns". This ordered for 1254, but actually done on 1316. (Retired Brass Transom Turns were saved for spares).
--Other cars to 1506 were then so equipped; and apparently in 1100s and low 1200s, #2 PS ventilator would be entirely new. Anyhow:
FE AND 1-MAN CARS 1166-1506:
GS: 2-12 automatic, 4-9 brass handle (??1173 I record 5th
PS: 2-12 automatic, 9 brass handle "automatic" #4 on PS)
CARS ~~1526~~ 1507-1854, and 2000-2001 AFTER 1928:
GS: 2-4-8-12 PS: 2-4-8-12 --All automatic ventilators.
ARRANGEMENT OF AUTOMATIC VENTS IN TRAIN 2000-2000A
2000: 2-4-8-12. (Signs in 10-11).
2000A: 6-9-12. (Signs in windows 3-4).

REAR DECK-ROOF WINDOW in 1173 1302 1346 was white glass painted red, most of which peeled off from 1173. (1173 Aug '47, others late '46.

SUPPLY CAR #97 NOTES: Gate handles were not changed, to open front door both handles had to be swung. --Stove removed, cab was heated by the resistors and by 4 ~~xtrix~~ electric heaters, placed vertically, 2 just left of controller, 2 in corresponding spot on right side.

"STRAWBURNERS" were called "FRIERS" at Nicollet, said C.S. (Applied to gatecar with resistors in cab. Neither name used at N.S.)

1136 FAIR GROUNDS MONEY CAR: Along gate side, first three double seats AND frames were entirely removed. On pole side, all frames were still in place. Laid fore-and-aft across the fourth seat frame were 4 electric strip heaters.

1230 NOTES: 2 bell boxes, both ring when any button is pushed. --At "rear", only one bell button on platform, to right of gate lever. --Any cab windows could be opened, including small ones in mirror windows, but NOT controller window. --Low fare-box holders at both ends, with a grab rail on step-side of farebox. Farebox could not be put on the regular pole. --Long bulkhead curtain both ends, front like gatecar, rear like one-man. --Two control switch boxes. --Two motorman's seats. --One reverse lever, one air valve, one fare box (at E.S. 8-12-51). --56 watt lights in car, perhaps four to a series. None on platforms. Four on each side as in gatecars, with one each side missing on front post where gatecar would have one. Two for front sign and one extra bulb to rear of them, centered in ceiling. Four for rear signs plus usual bulb behind them for fare box post.

MINOR MISCELLANEOUS NOTES

"STOP 10 FEET BACK" lettered on cars in 1937. Lettered on both ends of 847 813 875 876, but not on 898 at Duluth.

"REQUIRED BY LAW" was added under that stencilling in 1947 or early 1948, but mostly when cars were rebuilt, so that it was not done to a number of cars.

1441 on 8-2-45 used Scotchlite sample from MMM Co. Company record says car got "Tail light reflector & 'Stop 10 Feet Back' sign". The words were stencilled in usual way on large section of reflecting Scotchlite, yellow, superimposed on the steel plate. The Scotchlite sign was removed in 1441's Oct. 1950 rebuilding.

1322 on 11-12-48 had sign "Stop 10 Feet Back Required by Law" made of red Scotchlite letters. Most of the letters had peeled off by the time 1322 finished running.

1705 got "Safety Signal Lights" in April 1946. They were lights in box projecting out above the front door. Someone at Snelling then told me they thought it was a device to induce passengers to board at the correct entrance door, but company name "Safety Signal Lights" makes it seem more of a warning for motorists when passengers were alighting. --In Sept. 1948, I noted that the light box had been removed.

An "Entrance" - "Exit Only" sign, with "EXit Only" white on black rather than usual black on yellow, was noted in 1378 in Oct. 1948. I think later the same board was used quite a while in 1480. It seemed to me the white & black combination caught the passengers' attention more frequently than the other, and I think front window destination sign boards should also have been black & white.
--Those destination boards were very hard to see at night, on account of headlight glare, and when I taped a home-made white card "To 54th St" in upper right mirror window on one night run, passenger told me that at last I had a sign that she could read.

OUTSIDE SUN VISOR installed 4-19-27 on a Stillwater local car; it was pronounced "very good" and on 5-25-27 they were ordered for four cars #1 to #4. (Same in picture of #4 on Cedar Ave. in 1930.) These were removed by 1933 (according to picture of #1 on Franklin)

INSIDE SUN VISORS were installed in 1944 on all regular cars, at same time as Air Push windshield wipers were put in. These visors were attached to rod at pole side of the front window, and on gatecars could be swung to the left when the sun was in that window; but on button cars, whistle cord was in way, so they could not be swung.
--Lettering was later put on both sides of the visors, "Please Do Not Engage Operator in Unnecessary Conversation" (high-class lingo for Don't Talk to the Motorman.) First stencilling I noted was in #1 and #2, after their Nov. '47 rehabilitations. The stencilling was done quickly thereafter at the stations, yet several cars were missed: 1390 and 1820 at N.S. (1390 stencilled in 2-3-50 rehab); and perhaps all the Nicollet gatecars, as at N.S. later I found plain visors in 1366 1407 1409 1410 (1407 NOT stencilled when recoated Dec. 1950). Perhaps theoretically gatecar cab door would be shut and no one would talk to the motorman anyhow.

CURTAINS to shield against sun put in cars spring of 1947; one curtain size of small upper mirror window sash, to hang on hooks (that always came unscrewed) at top of mirror or controller window. East-West lines supplied first. Apparently all gatecars equipped at ES and Lake, but only 1563 at NS, though 1407 got brand new curtain in its 12-50 recoat.

MINOR MISCELLANEOUS NOTES

TRAIN CARS THAT HAD NUMBERS CHANGED: I made quick check of window sills in Duluth cars stored at N.S., 8-14-52. 1618 had two sills stamped 1618, three stamped 1670, one that looked like 1740. --1622 had four stamped 1622 (that car number had not been changed.) --1624 had six stamped 1624, two stamped 1701, and one sill very plainly stamped 1624 AND 1701. --After checking 3 cars I had 3 coffees and went home.

1600-200 TRAILER CONDUCTOR operated trailer gates, had a buzzer button on which he sent his "ding-ding" direct to the motorman. Passenger bells in the trailer sounded same as in motor car, so motorman didn't know from which car the bell had been rung. (Dave Erickson NS)
--From ES trainman: In original setup used a short time on trains, ~~since motor cond had trailer front exit to watch~~ motor car cond. handled his own gates besides the front exit of the trailer. Motorman operated only the motor car front exit, independently of the gates. This trainman recalled old regular passenger of his who, laden with grocery bags on his way home, would get off on Nicollet Island for a couple of quick ones. One night he got off front exit of the 1600, which was only door on train that opened in that case, and being small door, might not be very conspicuous to motorists alongside. Auto going by failed to notice door open, hit passenger, who went flying through the air, with bananas and carrots and cabbages everywhere. --The Automobile Club requested that gates should be opened every time front exit doors were, and the company devised the arrangement we had on front exit cars ever after.
--(In 1930, all 2000s still had arrangement by which rear door had to be opened whenever front door was, "as a signal to motorists.")

RADIO. In 1947, station WTCN-FM tested radio reception in PCCs, to find out how static free FM was. --Some years earlier, a successful experiment was carried out, in which one streetcar was operated by remote radio control from another streetcar.
--Mr. Green put radio receivers (for special transit advertising station) in many buses and in all 141 PCCs in 1950. (I was glad then that I was at North Side.) I noted aerials on some PCCs July 27; test broadcasts were made Aug. 30, and official breadcasting began Sept. 1. I thought music came through poorly, the buses made too much roar and there was too much "hum" inside the PCCs. However, the commercials came through fine, including one that started "Do you want a good used car?" --On 300-439, aerials were up forward in center of roof; 299's aerial was near edge of roof, GS, just above center doors. --The project did not pay, and the station went dead Feb. 17, 1951. --Aerials and speakers were not removed from the cars while they stayed in the Twin Cities.

PCCs 299-339 had metal shields installed in front of the conductor's position, from the floor up to the farebox, in the fall of 1948, on account of all the cold air those big doors let in.

FROST SHIELDS (first used 1937) on button cars were placed on three front windows, plus small one above the back-up control. In fall of 1948, frost shields were also added to window left of controller window (after years & years & years of telling the motormen to look to the left before they start up.) --Gatecars had only two frost shields, one on front window and long narrow one in the mirror window.

MINOR MISCELLANEOUS NOTES

EMERGENCY REAR-DOOR openers on button cars ("Break Glass, Pull Chain") were installed around 1942 I think. But 1176 never got one until its 1947 rehabilitation.

BUMPERS ON 2000s were painted brown (there was green skirting all around car below body.) In Feb. 1940, I noticed the 2000s' bumpers were then being repainted green. --These were all green by 1941. --The pups #1-#4 always had yellow anti-climbers.

FIRST YELLOW DOORS on lightweight cars were on #1 and #2, in their Nov. '47 rehab, then 2002-2003 in Jan. '48. In March '48, noted 2022 had yellow front door, brown rear door (was late '47 rehab, Oct.). 2018 also late '47 rehab, doors remained brown. Sept. '48, 2023, not a rehab, got yellow front door only, 2024 2025 2026 had both doors yellow. Later all 2000s had doors repainted, and all were yellow by June 1949.

DOOR OPENING of xb button car 1653, 45 inches at narrowest point.

DESTINATION SIGN HANDLES for side signs: normally at rear of sign roll, and 1136 and 1197 were normal. But 1196 and 1198-1220 had handles forward of the sign roll.

CAR NUMBERS ON FRONT BULKHEADS. On "high" board just below the sign in all gatecars, in 1136, in 1230 at the actual front end only, and in 1220 1221 1224 1226 1229 1233 1235 1238 1240 1248 1487 1490 1491 1500 1516; and also in 1441 and 1749, gilt number on white board, when those cars had green interiors. (1749's number put in normal lower position when regular finish restored.) --All cars had number in lower position above rear bulkhead opening, number there covered by car cards probably sometime during war.

GATECAR NUMBERS were also stencilled on rear platform side of the rear bulkhead, above the bulkhead doors (centered); but this was discontinued, I think with the 1944 rehabs. ~~--Gatecar rear platform sign "Conductor Has Been Instructed etc." was left out of cars beginning with 46-47 rehabs, I believe~~.

PCC INSIDE FRONT DOOR MIRRORS, in which motorman could see whether doors and steps were clear, were placed in button cars 1305 and 1679. I noted 1305's mirror gone after the PCCs had been sold.

CHANGER HOLDERS screwed to left front window post (changers on them would hold open the cover of the money box) were put in rehabbed cars beginning in 1949 (first noted in 1667, 1-17-49). In May they were put in older cars, and by December all button cars had been equipped.
--Previous changer holders were bar on edge of control table; no one used them, as changer then would be between motorman's knees, and any money dropped would go right down on the floor. Instead, motormen had provided their own holders, which clamped over air valve.
--2000s had near-useless changer-holder on the hand brake staff.

"STOP 10 FEET BACK" lettered on rear bumpers late '52, sometimes with Required by Law, usually in white, sometimes yellow paint (after ad frame covered older signs on car body). Nov & Dec 1952: done to Snell. service cars 1705 1706 1707 1708 1712 1714 1715 1716 1718 1732 1733 1741 1803 1845, storage spares 1494 1495 1502 1503 1504 1505 1506 1508 1510 1517 1518; NS 1499; ES 1317 while at Lake; Lake 1203 1205 1206 1207 1208 1209 1210 1211 1213 1214 1215 1216 1217 1218 1219 1220 1221 1223 1224 1227 1233 1235 1242 1424 1695 1698.

MINOR MISCELLANEOUS NOTES

"MOTORMAN'S EXTENSION CURTAINS", when used, gave button car motorman more privacy, and less glare on front windows. Shops ordered 200 of them, installed them in 1655-1854 in 1936. (2000s also had them, of slightly different type). The curtains folded up against the stanchion behind motorman's seat. In early 1949 I checked 157 button cars had the curtains. They were in 1527 and 1537, and in 1655-1854 with 42 exceptions: No extension curtains in:
1656 1666 1678 1684 1685 1686 1689 1693 1701 1709 1710 1716 1717
1718 1725 1727 1732 1734 1746 1750 1758 1765 1773 1776 1777 1779
1786 1787 1788 1792 1795 1797 1800 1812 1817 1823 1830 1835 1841
1843 1848 1851. (No check 1674 1699 1834). Some cars had green extension curtain. --All these curtains were removed in the summer of 1949.

SLIDING SASH IN GATECAR mirror windows installed 1930-1931. Sliding sash had small silver knob. Checked in early 1949, these OK with knob:
1254 1266 1267 1268 1269 1270 1271 1273 1274 1276 1277 1278 1280
1281 1282 1283 1285 1287 1288 1289 1290 1291 1329 1333 1335 1336
1337 1338 1341 1343 1344 1345 1346 1347 1348 1352 1354 1355 1359
1360 1364 1368 1374 1376 1380 1381 1401 1404 1405 1407 1409 1416
1423 1429 1436 1438 1442 1455 1471 1472 1474 1476 1478 1486 1547 1555
--Sliding, with small hole instead of knob:
1332 1339 1367 1373 1411 1422 1435 1483
--Solid sash, no sliding part:
1369 1377 1379 1406 1418 1419 1426 1427 1431 1432 1452 1457 1460 1461

SWITCH-holder fitting for PS switch-hole in 1611 was in backwards, switch on near side of motorman.

RADIO-EQUIPPED FORD COUPES 1949 (GESTAPO) were painted maroon for St. Paul --black for N.S. coupe (covered N.S. and NE and SE) and grey for Nic coupe (covered south Mpls.)

CONDUCTOR'S SUPPLY BOXES removed, bell cords cut near center of car and loose ends tied up, in most Duluth button cars. Supply boxes gone, and bell cords completely removed from Nicollet cars after that station went 1-man.

WORK CARS: arch-bar trucks with outside-hung brakes illegal by 1950. Arch-bar trucks with inside-hung brakes legal for company service use only. Such seen on # 61 at Nic 5-21-50; and these had gatecar trucks: 8 9 14 33 66.

1613 GOT 216 MOTORS in 1950, and was thereafter a good car, said E.S. shopman. Previously, it never got up any speed with GE200 motors.

NEWSPAPER BOXES placed in streetcars and buses by St. Paul Dispatch and Pioneer Press, sales started July 24, 1950. Paper boxes were green, fitted in the line of car cards. Papers available around the clock, self-service honor system (put 5¢ in slot). Boxes installed near center of buses and PCCs; next to stovepipe in standard cars (where passengers rarely noticed them, and M/M could hardly keep an eye on kids after money). Noted some Lake St. cars shortly after had the box up forward on the pole side. Boxes filled at St. Paul stations, and at 4-Wabasha and 7-Wabasha. --11-1-50, green paper box in NS car 1395. --Same date, at shops I looked in a Snell. PCC, 2000, and a big car, and saw no boxes, so project must have been discontinued by then.

MINOR MISCELLANEOUS NOTES

CAR CARDS - INSIDE

Installed in 1943: sign card holder on front vestibule partition, that is, on pole side front bulkhead window. Installed in 524 1-man cars from 1129-1354 and 144 2-man cars from 1254-1563 (it xxx said.) This was regrettable, for passengers, as it cut off their view of the hand on the controller, and the sheepskin coat in the corner.

--Similar card holder installed ~~by Green~~ on gate side, ~~early 1951 I think~~ IN 195, so that now you couldn't look out of either front bulkhead window.

--1951, car card board in front cab, on partition facing incoming passengers. Used at first for "Miss Car Cards" ads.

--Nov. 1951, near same ad board, small metal holders installed for "Take One" items, such as schedules. Holders painted green, strictly a bus item. (MRA should throw it out of 1300).

CAR CARDS - OUTSIDE

First outside ad frames put on by Strouse about June, 1946. All used for safety slogans only. Installed in over 200 button cars; no lightweights, no PCCs; no gatecars except 1266 1286 1357 1364 1373. Signs were small.

--6-13-49, Strouse replaced all above-mentioned small card frames, installed the large frames in same place, on ALL cars (to left of front door). The first new large cards were also safety signs, but the first actual advertising appeared on the outside of the cars later that same June.

--Feb. 1950, 2nd & 3rd frames were added, on gateside near rear and on pole side near front.

--Sept. 1950, ad frames put on front ends of cars.

--Sept. 1951, ad frames put on rear end of cars, and about the same time, card holders added on pole side toward rear. Total six big ad frames on outside of car. By now Mr. Ossanna was making more advertising mileage than passenger mileage.

--First beer ads went on outside of cars in July 1950, over a year after outside advertising began. First whiskey ads went on in September 1950. Break 'em in gently.

HEATER NOTES, ELECTRIC HEATERS.

--BUTTON STOVE CARS. #1 switch for top defrosters along front and rear windows. #2 for heaters at feet, under farebox, door heaters etc.

--2000s. #1 switch for main heaters throughout car. #2 for auxiliary heaters, corresponding to all heaters in a stove car.

--Only two switches in 1294 and 1327. #1 for main heaters. #2 for top front and rear defrosters as in stove cars.

--Other electric heat cars, as 1319: 3 switches: #1 for main heaters under seats, possibly also for one heater beside rear door. #2 for 10 heaters: 3 rear defrosters, 1 PS rear bulkhead, 1 farebox pole, 1 by front door, 1 by front switch rod, 1 on front farebox stand, 1 by motorman's foot, 1 on PS partition forward of switch box. Small switch (#4) for four front defrosters only.

NOTES ON #4. Car had 3 big storage batteries up front, Blewett didn't know why. --Outside and inside mirrors, each both on doorside of car. --Screens on both sides, 10 windows each. --Switches AT FRONT: button marked "P" turned off one headlight, ~~ta~~ other on (alternated whenever button turned). Other switches as in #1 & #2, line slanting to right, 1 doors & controls 2 heaters 3 heaters 4 air 5 lights. --MRA trip 4-16-50, club's air horn under car at front, regular horn at rear, gongs at both ends, result happy railfans.

MINOR MISCELLANEOUS NOTES

LIGHT SERIES #1-#2-#4. 23-watt gatecar-type bulbs, set in two rows in ceiling, six bulbs in a row. First five bulbs in either row were connected in series. Last bulb on each side connected in series with three bulbs in destination sign box.

--#4 had only one sign box, on the front end, wrong end for its trips between Fort Snelling and the station. #3 had two sign boxes.

--Two headlights, two tail-lights on #4 not accounted for. I wonder about the three big batteries the car had. So more detail:

TAIL-LIGHTS: SHOPS AUTH. 7201, 10-18-37, work complete 10-20-38. 722 cars, 1-4, 1124-1129, 1131, 1137-1138, 1146-1149, 1166-2030, 5 800s: "Remove present tail light batteries, install reflector type tail lights." --They retired 717 battery carriers, 719 batteries (2 each on #3, 1129, none on 800s). --A battery-operated tail light would not go out when power failed; one hooked up with other lights would, therefore reflector would have to be added. -?- --Shops Auth. 7204, 11-3-37, complete 1-5-40, button cars: Remove 56-watt headlight and "Entrance" box light; remaining eight 56-watt ceiling lights, two series four each, connected with re-installed 94-watt headlight. That much is clear. New series 5 15-watt bulbs, one fare-box, one tail light, three "Enter Here". OK. Previously there was one 10-watt farebox light, one 10-watt tail-light (these on 8 volts). Can't figure out their connection with tail-light batteries, especially since two jobs spread over such different lengths of time. Last auth. was for 541 1-man cars; 534 were done, 1124-1129 and 1131 being skipped; others perhaps all done during rehab (see time spread). (Or only two years spread?) --The 534 cars done: 519 button (no 1610 1629 1699), and the 15 2000s which were rebuilt to 1-man in 1932.

TRACK AND STATION NOTES.

DULUTH 4-14-39 Shop notes. On account of Hazel Park Pullout trouble: Order to BACK CARS IN on 7 8 9 10 11 12 tracks at night, so most would be headed in the right direction in A.M.

SNELLING 5-14-47 observations: 7-trash. 8-9 gatecars. 10-11 buttons. 12-13 PCCs. 14-15 buttons. 16- Snow Plows and #43. 17-18 open in day time for students to drive up and down. (Probably 2000s and more buttons at night.)

1939 OBSERVATIONS. --Only work cars kept on 4 yard tracks (outside) at East Side. --Noted 3 house tracks, 28 yard tracks at Duluth.

2000s seen on 4 track at Nicollet (June 1941), probably regular on 4 there, as they were at North Side. N.S. kept plows on 6 track.

WASHERS were all on 6 track at N.S., Nic., Lake, Snelling.

NICOLLET observations 5-21-50. 18 & 19 both very narrow, can't get by open doors of cars on these tracks. (Suggest these were lengthened late 1949). (Nic increased assignment of cars late '49, had been full previously. Even after this date, cars had to be left on 32nd St. every night.) --3 track had special lights for PCC overhaul; PCCs also often on 10 11 12. --Tracks not removed on 4-5-6 in older garage, but were removed from 7-8-9 in newer section. --2000s on 18, work cars on 19 this date.

EAST SIDE OBSERVATIONS 8-17-50. #1 Barn: Pits between ~~tracks~~ rails, but between tracks filled in with dirt instead of having wood floor. Tracks: 1-bus storage, 2-gatecar stovecar storage, 3-2000 storage, 4-gatecars, 5-empty, 6-snowplows, wire car #5. #2 Barn: 9-gatecars, 10-PCCs & buttons, 11-PCCs & gatecars, # 12-sand car. ~~#13~~ #3 barn: #68 and ash rack (later #5 kept behind #68); 14-PCC overhaul; 15-parts & supplies, 18-coal and sand pits. 21, 24-gatecars.

MINOR MISCELLANEOUS NOTES

TRACK NOTES. --PCC overhaul tracks were 3 track at Duluth, 4 track at Snelling. --In 1950, tracks 10-11-12 were ripped out at Lake, pits filled on 4-5-6 (4 had been equipped for PCC overhauls), but 6 continued to be used by cars going through washer. --On all East Side wood floors between tracks, sheets of tin were nailed down, each about 6 feet long and 2 or 3 feet wide, at right side of tracks at spot where cars were fired up.

EMBLEMS. Rusterholz said that about 1923, car 1790 had TCL emblem, just like those later used, but on right side only and just ahead of the rear gate. (He did not recall any air gate car). --He also said that PCCs 323 333 336 337 came without emblems on the pole side, and never got any. I never noticed this, but do note in picture that 326 just after arriving at Snelling, did not have emblem on pole side.

CAR 299 had fan in corner by operator's seat, other cars did not. 299 "had" (past tense here) brass plates "St. Louis Car Co." above both doors, whereas other PCCs (except one) still "have" such brass plate above center doors only.

STOP LIGHT GLASS on PCCs was yellow, but as time went on some red glass (from buses) was used: 389 got both red stop lights, 337 got PS light red, 300 and 338 got GS glass red.

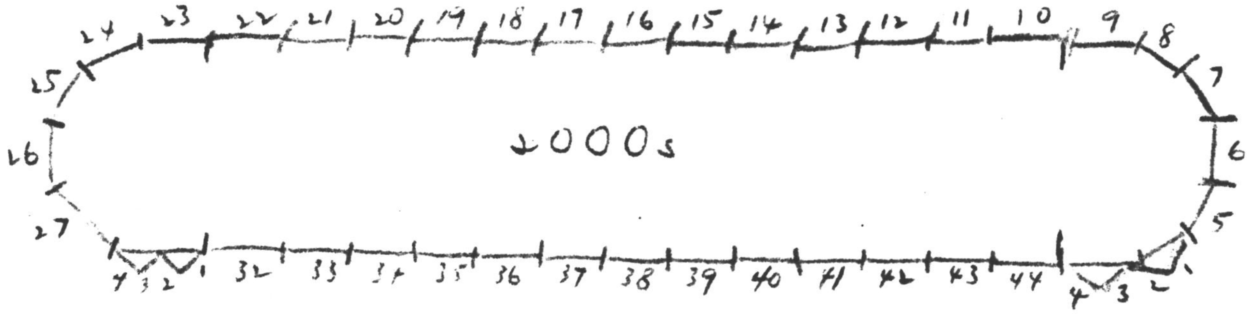
SWITCH NOTES. Electric switches added 1949 for PCCs: on 2SNE NB at 1ANE, on Marquette EB at 2 St, on Lake EB at Nicollet (for GM left turn), all in August. In Sept 1949, two switches on Nicollet NB at Lake, for PO cars turning either right or left. Also 1949, on Como WB at Thomas. 8-19-50, on Lake EB at Cedar for 34A car to turn right, and on Lake WB at Bloomington; and 8-26, on Bloomington SB at Lake for left turn. (ELECTRIC switches now out of use, Cedar SB at 35th, Franklin EB at Bloom, Cedar SB at 8 St, Cedar NB at Franklin). --After end of B Crosstown, 5-12-50 switch on Bdwy EB at Emerson changed to manual, though still often used; foreman said they could not adjust it to work right. On Bdwy EB at Wash, switch on to single track for Bdwy car, still worked electric 6-23-50 when I told foreman. Switch NB on Wash at Bdwy remained electric for very long time, used at night by Penn owl. --12-12-49, new entrance to Snelling Station at Simpson open, two electric switches EB and WB on Univ as at old entrance, and switch in yard for POs to turn east or west was electric (manual switch at old exit from yards).

EXTERIOR TRIM around PCC standee windows, was yellow on ~~300 330~~ 300-339, green on 340-439.

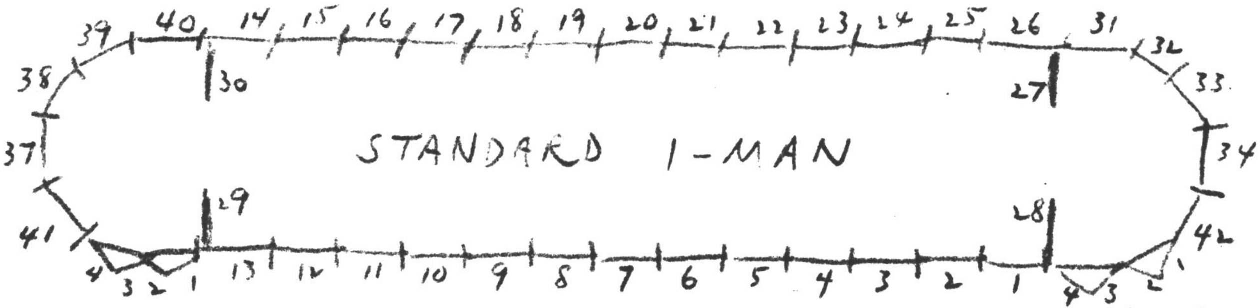
SIGN NOTES. BUTTON CAR SIGNS IN PCCS. 299 had white front sign, later got white sign with partial black readings. --While Duluth's 389 was in shops being rebuilt after wreck, its assignment was changed to Nic (late 1951), and 429 went to Duluth and got white front sign. --Late 1952, transfers to E.S., 353 354 355 got white Nic signs; E.S. button car signs went in 337-352, 357-361, 423, 427-432, all black cloth signs except partial black signs in 344 349 430. NIC PCC SIGNS USED IN BUTTON CARS AT E.S: 1953-1954: both signs of 1532 1580 1628 1678, GS 1590 1615, FS 1617, and FS 1307 1309 1764 with no other signs in last three cars. --1795 at E.S. got front sign, late 1953, with "OAK TO BEACON" sewed in the roll upside down. --I only ever saw BRYN MAWR reading in two button cars, 1757 and 1770; order of readings was BL, BM, BL38, EMS, RF.

SYSTEM OF NUMBERING OF STREETCAR WINDOWS.

The numbering system shown on rough diagrams below was dated Feb. 25, 1933, evidently a revision of an earlier system. I copied it at North Side in 1949, and finally figured it out in 1955.


2000s
24 23 22 21 20 19 18 17 16 15 14 13 12 11 10 9 8
25 7
26 6
27 5
4 3 2 1 32 33 34 35 36 37 38 39 40 41 42 43 44 4 3 2 1

Apparently earlier numbers on 2000s, had front door windows numbered 1-2-3-4 left to right, and rear door windows 28-29-30-31 left to right. (Same numbers apply to either upper or lower sash in any one window). Reason for changing would be to have 2000 doors numbered same as on new standard button cars.


STANDARD 1-MAN
39 40 14 15 16 17 18 19 20 21 22 23 24 25 26 31 32
38 30 27 33
37 34
41 29 28 42
4 3 2 1 13 12 11 10 9 8 7 6 5 4 3 2 1 4 3 2 1

This appears to be revision of numbering system used on front exit gatecars, which must have had no numbers for windows in front exit door or bulkhead doors. Gatecars would not have had a window number 41 (except 1600 train cars). Gatecar mirror window would be number 36. Between it and front window would be window number 35, which in button cars is renumbered to 42 (incline window being so different from standard gatecar cab window.)

The chief referance I saw which used the window numbers, was shop work authorization for putting inclined sash in window # 42.

MINOR MISCELLANEOUS NOTES

1269 GATE OPENINGS measured in 1952, each opening 25 1/2". Each gate section measured 13 1/4", the small fixed piece at rear was 5 1/4" wide. 1136, each gate piece 16" across, rear fixed piece 11" wide.

ADVERTISING ON OUTSIDE OF CARS. I heard that reason for putting emblems on the standard cars was to prepare them for visualized advertising program in which each car would have six ouside ads, three each side (front middle and rear of side). If so, wood cars still had number in middle of car. Ads in center of car could have been reason for painting numbers on ends of car. However center ads were never put on, there were six large ad racks on cars already with the end ones, and these were rarely all used by advertisers.

NUMBERS ON ENDS OF CARS (EXTERIOR). It is said Mr. Larrick brought this idea from Los Angeles. Shopmen and other employees appreciated it. It had some value in streetcar watching, but I detested it anyhow.
--First end numbers were put on cars in June 1952 (first seen on 1169 returned from shops June 20.) Numbering was done at shops only. In August numbers were put on all operating AND storage cars at Snelling, including 299. This was not repeated for later storage cars. No end numbers were put on cars after March 1953.
--No 2000s got end numbers. None on 1230 or 1136.
--Only gatecars with end numbers were 1266 1267 1268 1270.
--All PCCs got end numbers except 383 393 408.
--Of button cars scrapped or sold in 1952: Had end numbers: 1235 1408 1490 1496 1541 1553 1597 1655 1713 1735 1736 1737 1810 1813 1832 1840. None: 1507 1534 1613 1723 1751 1771 1774. Probably none: 1247 1728 1731 1749. Probably had them: 1612.
--BUTTON CARS ON 1953 LIST AND LATER: All HAD END NUMBERS, EXCEPT the following:
1166 1168 1170 1171 1176 1177 1178 1180 1181 1182 1183 1184 1185 1186
1188 1190 1192 1193 1194 1219 1220 1223 1225 1226 1228 1229 1244 1248
1249 1250 1251 1252 1253 ~~1229~~ 1389 1391 1393 1394 1395 1396 1309 1322
1323 1327 1415 1464 1465 1466 1467 1479 1480 1488 1519 1520 1522 1528
1538 1543 1544 ~~1557~~ 1551 1552 1557 1559 1561 1570 1572 1575 1585 1598
1600 1601 1602 1603 1604 1606 1607 1616 1617 1618 1621 1622 1624 1625
1627 1630 1633 1634 1635 1638 1642 1645 1646 1650 1651 1652 1654 1659
1660 1661 1675 1679 1680 1682 1683 1684 1688 1690 1703 1709 1711 1719
1722 1734 1739 1746 1750 1755 1756 ~~15xx~~ 1757 1758 1772 1783 1787 1790
1792 1794 1795 1798 1802 1805 1807 1808 1819 1823 1824 1827 1828 1829
1831 1835 1837 1838 1839 1843 1847 1848 1849 1854.

OF 1424's STEEL FRONT END: Rusterholz said it ran for many months with steel plates on front end only. My own record said in Jan. 1940 that it looked as if it had steel front end, but afterwards I hadn't believed my memory, as soon it was complete steel-side car in its May 21, 1940 rehabilitation.

OF AIR GATE CAR: Callendar had picture of cars at Wildwood about 1922, one car had small protuding objects at top of rear gates, he said it was a Minneapolis car which at that time had either air or electric gates. In 1954, Lake St. shopman said he remembered car well, thought it had an auxiliary air valve for operating gates, and said it was 1671 at Lake St, often used for experiments. That does not ~~fit~~ fit with Lake assignment very well, but is possible. A 1700 would be more likely.

MINOR MISCELLANEOUS NOTES

BADGE NUMBERS FOR TRAINMEN, 1930s and 1940s.
Odd numbers for motormen, even for conductors. Odd numbers for motorettes, always termed "Operator". (Also interesting terminology, drivers on 2-man cars were all officially called "Motorman" but on 1-man cars the official term was "Operator".)

	MEN	WOMEN
East Side	1- 599	3735-3899
Nicollet	600-1099	3901-4099
North Side	1200-1699	4101-4299
Lake St	1700-2299	4301-4399
Snelling	?2300-3199?	
Duluth	3200-3799 at least.	

Minneapolis list is from the war. With additional hiring in 1946, North Side commenced using 1100 badges again. Late in 1947, when there was much hiring for 40-hour week, additional ranges of numbers were used for M/M at each station (odds only), Nic having 5200s, N.S. 5300s, other stations having similar new numbers. Soon thereafter this was stopped (probably early 1948), the 5000 numbers abandoned, and even numbers in the old ranges assigned to motormen. All conductors were then changed to new numbers (still evens only): ES 3200s, Nic 3300s, NS 3400s, Lake 3500s, Snelling uncertain. --All men transferring to bus had been getting different badges for bus only, all Mpls. numbers below 1000 I think, both odd and even. Under Mr. Green this was changed, so only streetcar badge numbers were used; old "original" bus drivers who had never been on streetcar got 5000-series numbers. After city seniority was voted in Mpls, all new trainmen in Mpls. got low numbers formerly belonging to ES only.

OF ORIGINAL CAR 1719, built 1914, sold to Duluth in 1916, their #268: In 1939, after closing of Duluth lines, it was sold to Duluth Mesabi & Iron Range Ry., and converted to operate as a diesel electric car. It was still running in 1952 with its old trucks and motors. Diesel engine installed which generated electricity to run traction motors. Car was in Proctor, Minn., and had a run just under a mile from end of bus line to DMIR roundhouse, and was for roundhouse and shops employees only.

PORTABLE FARE-BOXES used at City Limits on Como and Selby were very old, bought second-hand from Canadian city. They were tried on Interurban some, but money put in them could not be removed, and with the big collections made on Interurban line, motormen was soon running out of change. New portable money-meters were bought and used some time; they were small and could be held in one hand; coins registered and could be used again by motorman; only dimes and tokens would go in it, except that pennies would go in but would register as dime; only one coin at a time could go in, then plunger would have to be re-set. These money-meters were unsatisfactory, also too much time was consumed in City Limits fare collections, so the Int line soon reverted to the Pay Leave system even for one-man operation.

Small metal card on front bulkhead below destination sign, reading "Please Leave By Rear Exit", was installed in most button cars beginning very early in 1952, first seen Jan. 11 in 1182. On PCCs the same message was stencilled in black (against green) at front end, not very legible.

CONTENTS OF

BACK POCKET

Old TCL Data Sheets

46(b)	1-2	Wreckers
56(b)	11	Work Car
70	1	auto Bus
71	2	Trolley Bus
72	3	Trolley Bus
75	1-2	Wire Cars
76	3	Wire Car
77	missing	(4 Wire Car ?)
78	5	Wire Car

1	505, 09-10, 13, 16, 24, 36, 38, 1523, 29, 34	ST DE Northern
1(a)	608-26	
2	540-47, 49-51	O-x-m
4	707-31	O-x-tr

51	448, 52, 70-71, 73, 90	Sanders & Salters

PCC Cars

9(a)	299
10(a)	300-19, 65-89
11(b)	320-64
12(a)	390-414
13 (a)	415-39

WISCONSIN RAILWAY HISTORICAL SOCIETY
5930 West Fillmore Drive
West Allis 19, Wisconsin

LISTING OF TWIN CITY RAPID TRANSIT EVALUATION DRAWINGS

Size 4" X 7"   Price: each   (Note: Double sheets at twice single price)

Sheet No.	Car Nos.	Description
1	505,509-510,513,516,524, 536,538,1523,1529,1534	Single Truck "Northern Dinkies"
1 (a)	608-626	Class A-3-h Urban Cars
1 (b)	764,780-781,800-802,806, 809,814-816	Standard Passenger Cars
1 (c)	813	Class F Double End Car
1 (d)	4	Class A Lightweight Double End Car
2	540-547,549-551	Class O-x-m Open Cars
2 (a)	737-751	Class B-5-h Urban Cars
2 (b)	813	Double End Car
2 (c)	847	Class G Double End Car
2 (d)	3	Class A Double End Lightweight
3	752-762	Class B-5-h Urban Cars
3 (a)	847,854-858,866-868	Standard Passenger Cars
3 (b)	875-876	Class G Double End Cars
4	707-731	Class O-x-tr Open Cars
4 (a)	764,780	Class B-5-g Urban Cars
4 (b)	896-898	Class G Double End Cars
5	781	Class B-5-g Urban Car
5 (a)	900-946	Class G Standard Passenger Cars
6	947-951	Class G Standard Passenger Cars
7	905-941	Standard Passenger Cars
7 (a)	953	Class G Standard Passenger Car
8	942-946	Standard Passenger Cars
8 (a)	961-974	Class H Standard Passenger Cars
8-A	817-831	Class B-5-g Urban Cars
9	975-991	Class I Standard Passenger Cars
9 (a)	299	PCC
10	975,981-991	Class I Standard Passenger Cars
10 (a)	300-319,365-389	PCC's
11	955-975,981-991	Standard Passenger Cars
11 (a)	992-1006	Class I Standard Passenger Cars
11 (b)	320-364	PCC's
12	1007-1041	Class I Standard Passenger Cars
12 (a)	390-414	PCC's
13	1042-1046	Class I Standard Passenger Cars
13 (a)	415-439	PCC's
14	1047-1087	Class J Standard Passenger Cars
14 (a)	1112-1113,1115-1123	Class L Suburban Cars
15	1088-1107	Class J Standard Passenger Cars
16	1124-1128,1131	Class J Standard Passenger Cars
17	1129	Class J Double End Car
17 (a)	1120-1123	Class L Suburban Cars
18	1136	Class J State Fair Office Car
18 (a)	1145	Class L Suburban Car
18-A	1146-1149	Inter Campus Standard Passenger Cars
19	1143-1144	Standard Passenger Cars
19 (a)	1145,1150-1163	Class M Suburban Cars
20	1164-1165	Class J Standard Passenger Cars
21	1166-1178,1180-1185	Standard Passenger Cars
22	1184-1201,1203,1205-1211,1213-1218	Class K Standard Passenger Cars

Sheet No.	Car Nos.	Description
22 (a)	1186-1201,1203,1205-1211,1214,1218	Standard Passenger Cars
23	1169-1192	Standard Passenger Cars
23 (a)	1219-1229,1233,1235-1253	Class K Standard Passenger Cars
24	1230	Class K Double End Car
25	1198-1201,1203,1205-1211,1213-1220	Standard Passenger Cars
25 (a)	1246-1253	Class K Standard Passenger Cars
25 (b)	1236-1242	Class K Standard Passenger Cars
26	1243-1245	Class K Standard Passenger Cars
27	1246-1253	Standard Passenger Cars
30	1266-1271	Class N Standard Passenger Cars
31	1291-1292	Class N Standard Passenger Cars
31 (a)	None Listed	Class I-1-f Standard Passenger Car
32	1329-1359	Standard Passenger Cars
32 (a)	1293-1328	Class N Standard Passenger Cars
33	1329,1335,1338-1343,1345-1348,1350-1351,1355,1357	Class O Standard Passenger Cars
33 (a)	1360-1370	Class K Standard Passenger Cars
34	1362,1366-1367,1369,1375-1376,1381,1383	Class P Standard Passenger Cars
34 (a)	1371-1375	Standard Passenger Cars
34 (b)	1412-1413	Class Q Standard Passenger Cars
35	1382,1384-1398,1402,1408	Standard Passenger Cars
36	1380-1424	Standard Passenger Cars
36 (a)	1399-1401,1403-1407,1409-1414	Class P Standard Passenger Cars
36 (b)	1415,1417,1420,1424-1425,1430,1433,1437,1440-1441,1446,1448,1450-1451,1454,1462,1464	Class S Standard Passenger Cars
37	1400-1401,1403-1404,1407,1409-1410,1416,1418-1419,1422-1423,1426-1427,1429	Class R Standard Passenger Cars
37 (a)	1481	Class R Standard Passenger Car
38	1436,1439,1457,1459-1461,1472,1478	Class R Standard Passenger Cars
38 (a)	1482-1492	Class R Standard Passenger Cars
39	1483,1514,1542,1555,1563	Class R Standard Passenger Cars
39 (a)	1542,1547	Class R Standard Passenger Cars
40	1532-1573	Standard Passenger Cars
40 (a)	1465-1470,1473,1475,1479-1480	Standard Passenger Cars
40 (b)	1548-1577	Standard Passenger Cars
41	1482,1485,1487-1492,1494-1513,1515-1531	Standard Passenger Cars
42	1532-1541,1543-1546	Class T Standard Passenger Cars
42 (a)	1578-1599,1626-1629	Class S Standard Passenger Cars
43	1484,1486,1493,1514,1542,1547,1555,1563	Class S Standard Passenger Cars
43 (a)	1582-1599	Class S Standard Passenger Cars
44	1630-1644	Class S Standard Passenger Cars
44 (a)	1668-1681	Class L-8-K Standard Passenger Cars
45	1548-1554,1556-1562,1564-1593	Class S Standard Passenger Cars

Sheet No.	Car Nos.	Description
46	1578-1583,1587,1589, 1591-1594,1596-1598	Class S Standard Passenger Cars
46 (a)	1685	Class L-8-K Standard Passenger Cars
46 (b)	1-2	Wreckers
46-A	1686-1690	Class L-8-0 Standard Passenger Cars
47	1594-1602	Class S Standard Passenger Cars
48	1736-1785	Class T Standard Passenger Cars
48 (a)	1603-1604,1606-1611, 1614-1628,1630-1644	Class S Standard Passenger Cars
49	1786-1835	Class T Standard Passenger Cars
49 (a)	1645-1652	Class T Standard Passenger Cars
50	1836-1854	Class T Standard Passenger Cars
50 (a)	1653-1673,1675-1688, 1690-1698,1700-1702	Class T Standard Passenger Cars
51	448,452,470-471,473,490	Sanders and Salters
51 (a)(dbl)	201,204,206,208,210,214, 217-218,1606,1608,1610, 1617-1618	Class S Two Car Trains
51 (b)	1703-1752	Class T Standard Passenger Cars
51-A	1622-1624	Class S Standard Passenger Cars
52	1753-1789	Class T Standard Passenger Cars
53	1790-1792,1794-1826	Class T Standard Passenger Cars
54	1827-1833,1835-1854	Class T Standard Passenger Cars
56 (double)	2000-2001	Class M-9-1 Two Car Train
56 (a)	2000-2001	Class A Lightweight Deck Roof Cars
56 (b)	11	Work Car
59 (double)	2002-2003	Class P-14-m Two Car Train
59 (a)	2003	Class A Lightweight
61 (double)	2004-2005	Two Car Train
62	2004-2005	Class A Lightweights
63	2006-2030	Class A Lightweights
70	1	Auto Bus
71	2	Trolley Bus
72	3	Trolley Bus
75	1-2	Wire Cars
76	3	Wire Car
78	5	Wire Car
201	No Number	Private Car
201 (a)	"Excelsior"	Steam Boat
202	"Harriet","Hopkins", "Stillwater"	Steam Boats
203	"Hercules"	Steam Tug
205	No Number	State University Switching Car
206	34	Baggage Car
209	43-45	Sand Cars
211	58,61	Cement Cars
212	61	Cement Car
213	20	Switch Car
214	21	Wrecking Car
216	74	Yard Crane
217	50	Crane Car
217 (a)	50	Crane Car (Rebuilt)
219	7-11,13-14,16-19,46-48	Work Cars
227	A-14	Calcium Chloride Sprinkler
228	62	Steel Work Car
229	64-69	Steel Work Cars
230	19	Work Car
231	63	Steel Work Car

TWIN CITY RAPID TRANSIT EVALUATION DRAWINGS—Page 4

Sheet No.	Car Nos.	Description
232	2	Supply Car
232 (a)	95	Supply Car
232 (b)	97	Supply Car
235	49	Refuse Car
238	22-24,29-32,36-38	Snow Plows
239	23-24	Snow Plows
240	25	Snow Plow
241	29-32	Snow Plows
243	38	Snow Plow
244	75-82	Snow Plows
245	No Number	St Paul Southern Ry Plow
247	81-82	Snow Plows
250	72	Wire Car
251	3-5,72	Wire Cars
252	33	Wire Car
255	27	Shifter
256	26,28	Shifters
259	39-40	Rail Grinders
261	35	Sand Blast Car
262	70	Sand Blast Car
264	6	Power House Car
265	57,60,73	Electric Shovels
266	94	Shovel, Skimmer, Ditcher
270	59	Sprinkler Car
271	83	Locomotive Crane
274	96	Track Grinder
X-1	1542	Class T Standard Passenger Car
— (a)	220-221 (DSR)	Duluth Incline Cable Cars
— (b)	255-256 (DSR)	Duluth Double End Cars
— (c)	257-278 (DSR)	Duluth Class L-S-O Standard Passenger Cars